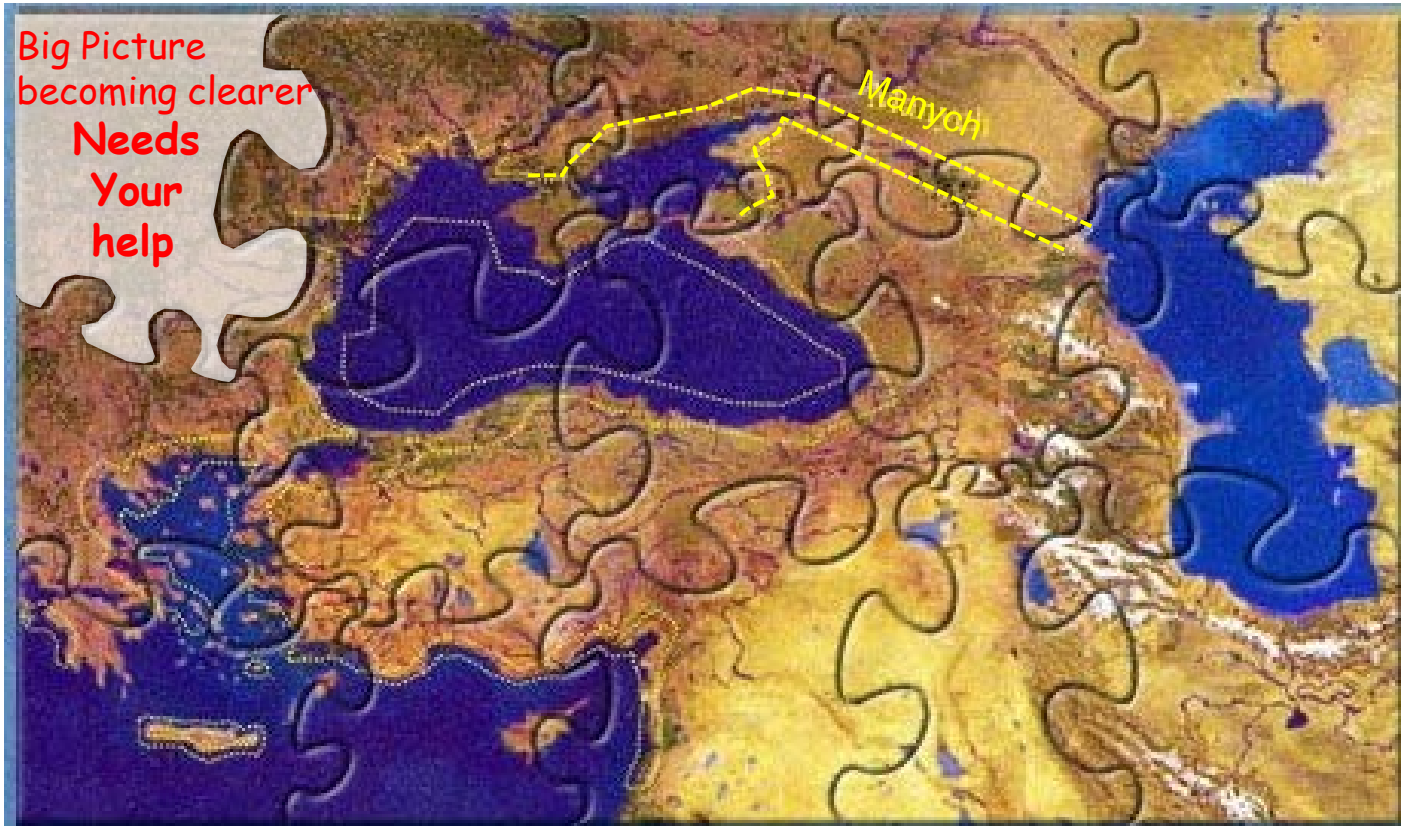


Strandlines on Azerbaijan's Mud Volcanoes and coastal interior: New evidence of a catastrophic marine flood impacting the Ponto Caspian and Aral Sea regions with its implications to natural science and humankind.

Ronnie Gallagher

St Petersburg - The Second International Conference on the Aral Sea Problems,
15-18 November 2019

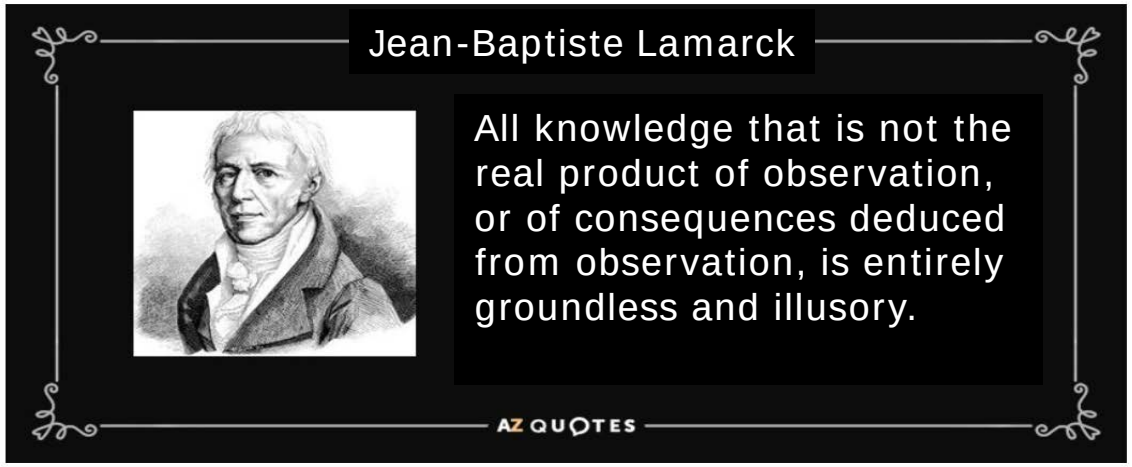
Aims of Talk

1. Demonstrate a marine flood around 10,000 yr BP.
2. Consider consequences of the flood - physical, chemical and biological.
3. Demonstrate freshwater flooding during the Ice Age.
4. Theorise how the marine flood happened
5. Can any lessons be learned?

Цели разговора

1. Продемонстрируйте морское наводнение около 10 000 лет BP.
2. Рассмотрим последствия наводнения - физические, химические и биологические.
3. Продемонстрируйте наводнение пресной воды в ледниковый период.
4. Теора, как произошло морское наводнение
5. Можно ли извлечь какие-либо уроки.

Some Words of Wisdom / Некоторые слова мудрости



***It is another property of the human mind that whenever men can form no idea of distant and unknown things, they judge them by what is familiar and at hand*.**

- Giambattista Vico – (Italian Philosopher)

Scientific process is to challenge assumptions and interpretations. Trust the evidence!.

Russian Proverb:

Doveryai, no proveryai – Trust, but verify.

Gilazi Valley Strandlines Puzzle
Гилази долине Strandlines головоломки

Professor Victor Baker – Can't explain but are 'relatively recent' (i.e.Holocene)

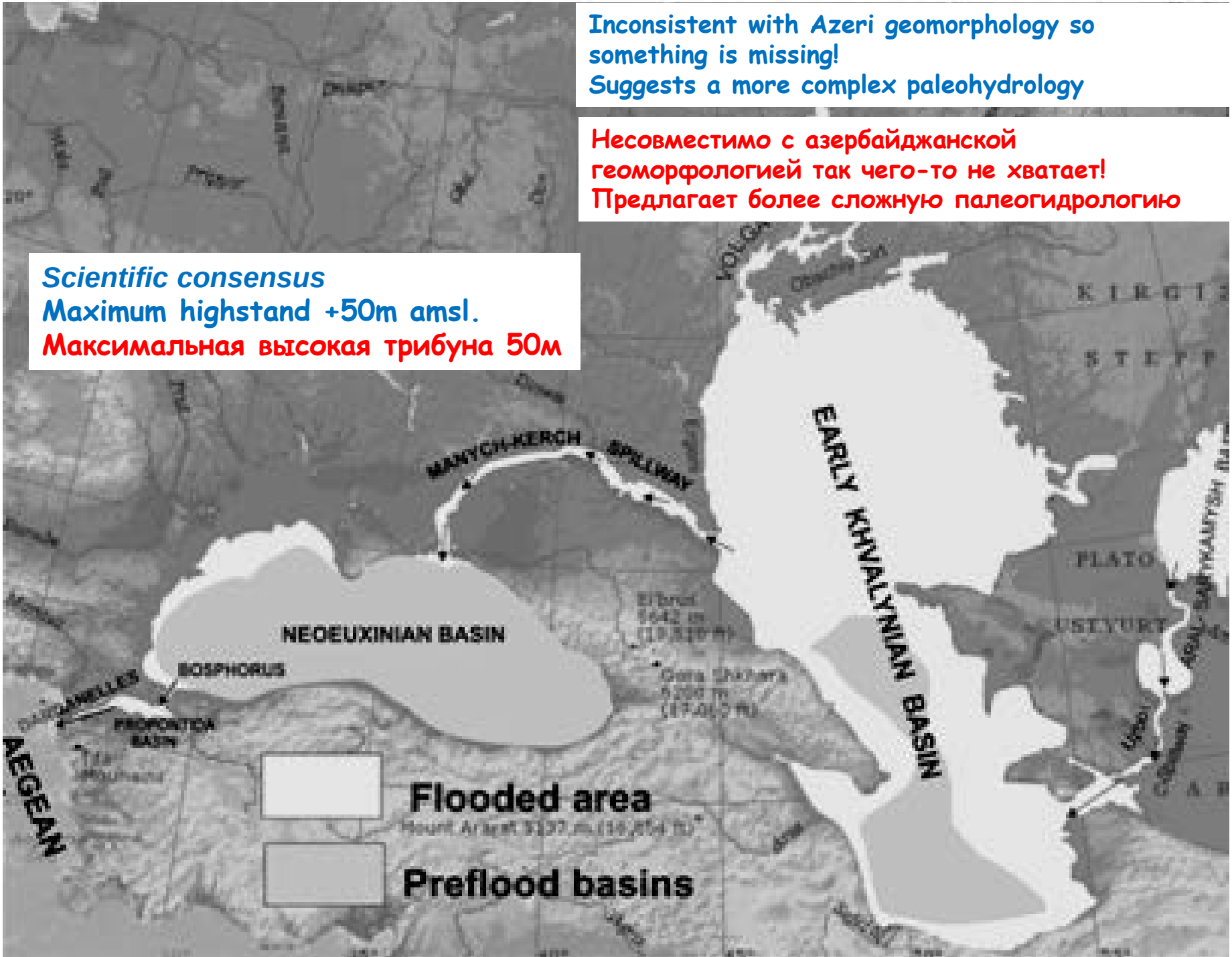
Gilazi Valley Puzzle

'Strandlines are very real and require an explanation'

(Professor Hussein Bagirov,
President Western Caspian University,
ex Minister of Ecology and Natural Resources

222m asl


Boyuk Kanizadagh Mud Volcano / Боюк Канизадх Грязный вулкан
BK
100m asl
Puzzling white 'strandline
Загадочная белая "нистрынлайн
22 6 2002


Inconsistent with Azeri geomorphology so something is missing!
Suggests a more complex paleohydrology
Несовместимо с азербайджанской геоморфологией так чего-то не хватает!
Предлагает более сложную палеогидрологию
Scientific consensus
Maximum highstand +50m amsl.
Максимальная высокая трибуна 50м
MANYCH-KERCH
SPILLWAY
EARLY KHVALYNIAN BASIN
NEOEUXINIAN BASIN
BOSPHORUS
PROPONTIDA BASIN
AEGEAN
Flooded area
Preflood basins

Mud Volcanoes

Provides a tool to investigate Caspian Highstands and Their Implications

Предоставляет инструмент для исследования Каспийские высотки и Последствия

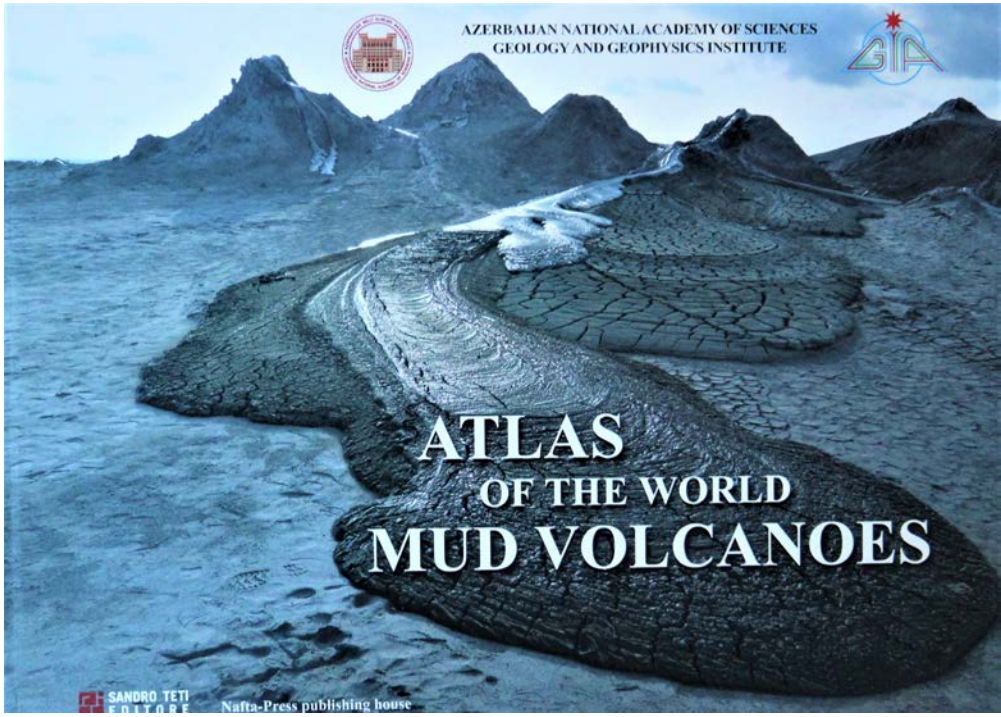

Coffee ring mark
- Indicates upper level


Multiple rings
Falling level

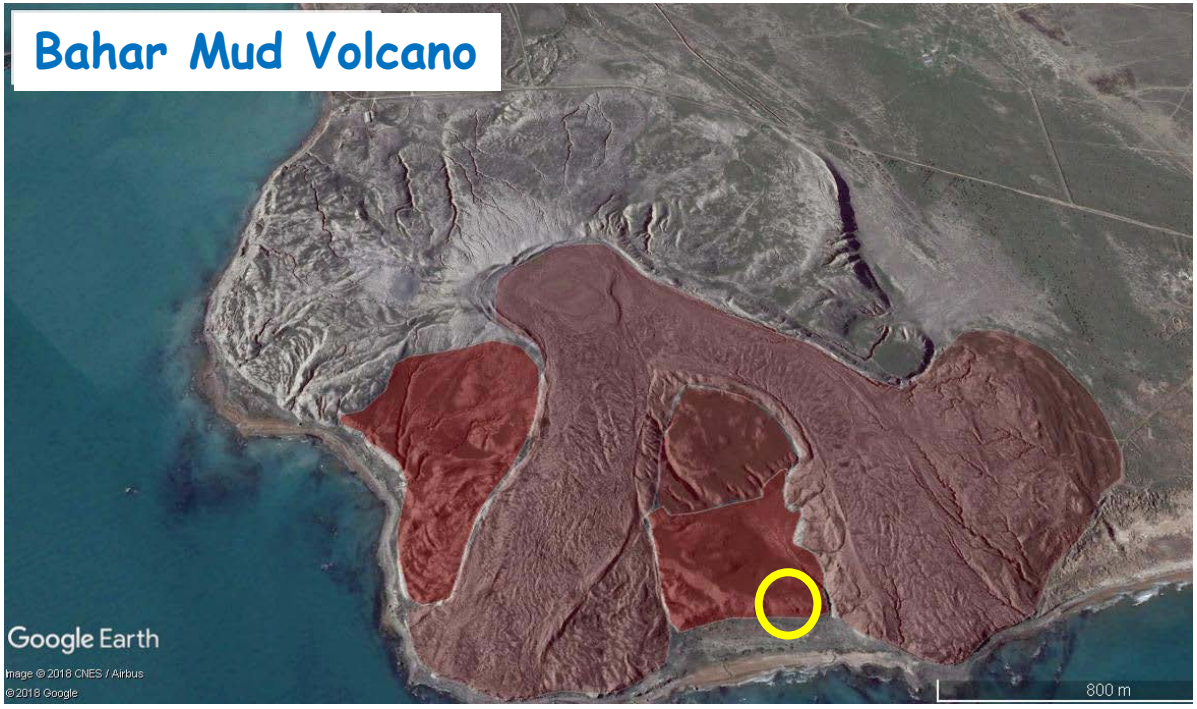

Coffee residue
Contamination


Clean Surface
No staining/water?

Xara Zire Mud Volcano



Bahar Mud Volcano



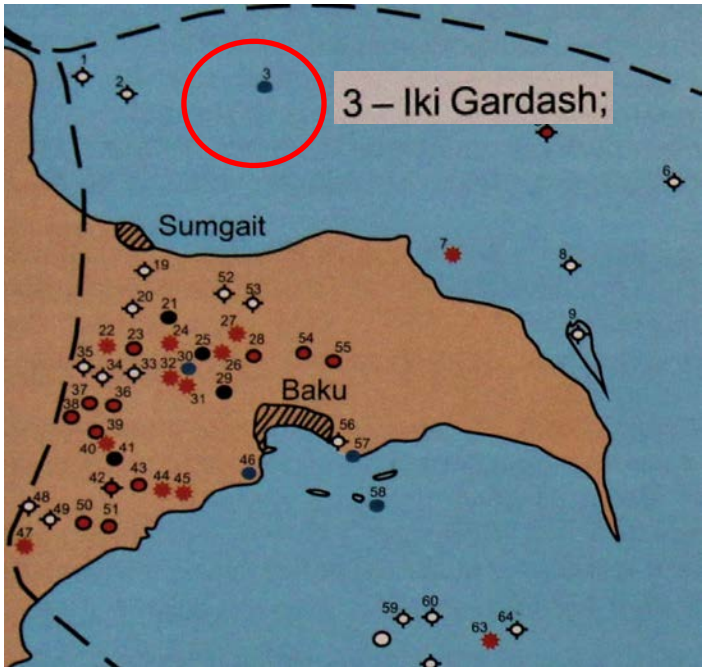
Bahar Mud Flow, front edge destroyed by Caspian Sea wave action.

Бахар Грязный поток, передняя кромка, разрушенная волной Каспийского моря

Два острова братьев Уничтожено Каспийским морем

1835 Map of Russia in Europe showing the Two Brothers Mud Volcanoes, (aka Dva Brata / Iki Gardash)

Islands above water



Islands Destroyed by Caspian Sea

Implication

Mud volcanoes easily eroded by rain and wave action

Грязевые вулканы легко размываются дождем и волновым действием

Boyuk Kanizadagh Mud Volcano Missing wedge

Бойук Kanizadagh Грязный вулкан Отсутствует клин

Музей петроглифов Гобустана

Missing wedge due to a Caspian Highstand and wave action erosion

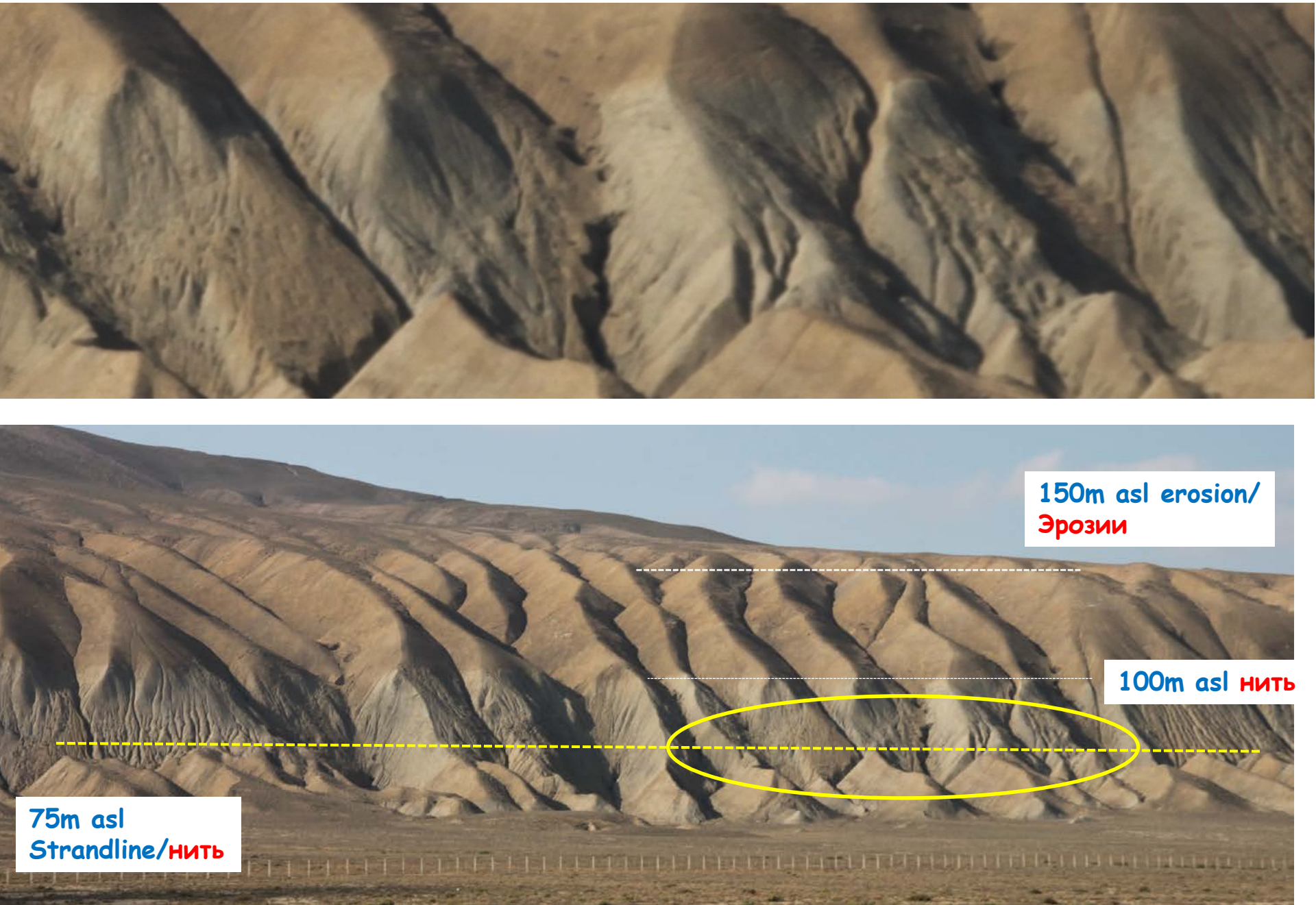
388 m

Imagery Dates: Mar 26, 2009 - Sep 26, 2009 40°08'45.66" N 49°23'48.83" E elev 166 m Eye alt 916 m

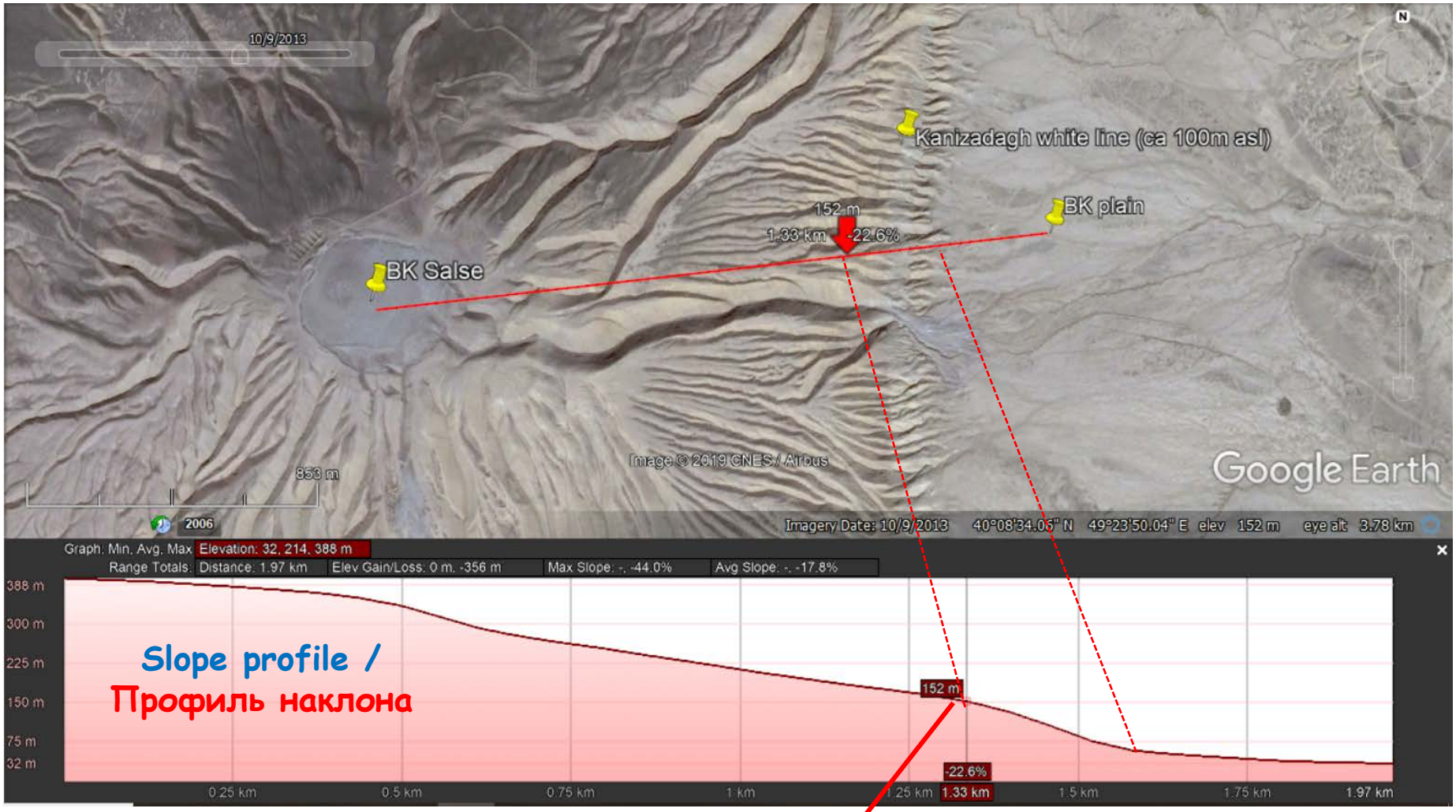
Boyuk Kanizadagh.Limited Wave Erosion/ Temporary Caspian Highstand

Бойук Канизадаг Ограниченная волновая эрозия/ Временный Каспийский высотный стенд

No wave action erosion at white line. So not a strandline. **What is it?**
Отсутствие эрозии волнового действия на белой линии. Так что не нить. **Что это такое?**



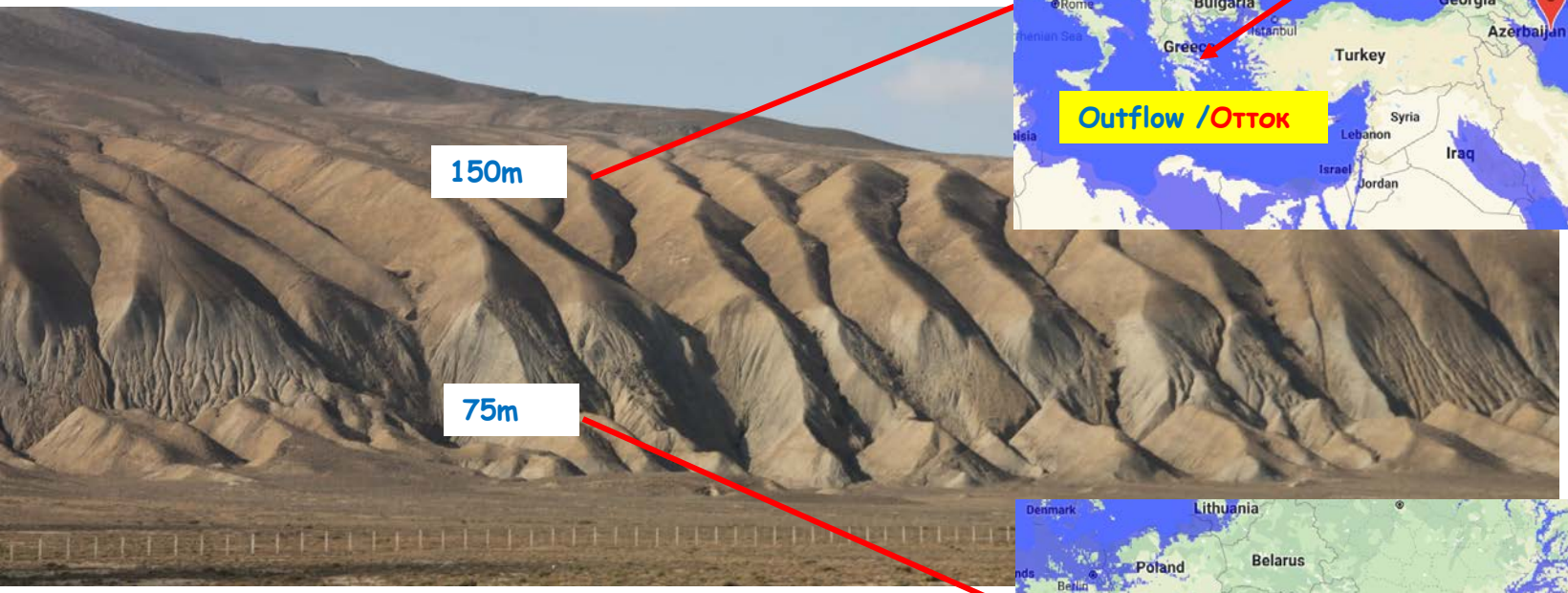
BK Satellite Image / BK Спутниковое изображение

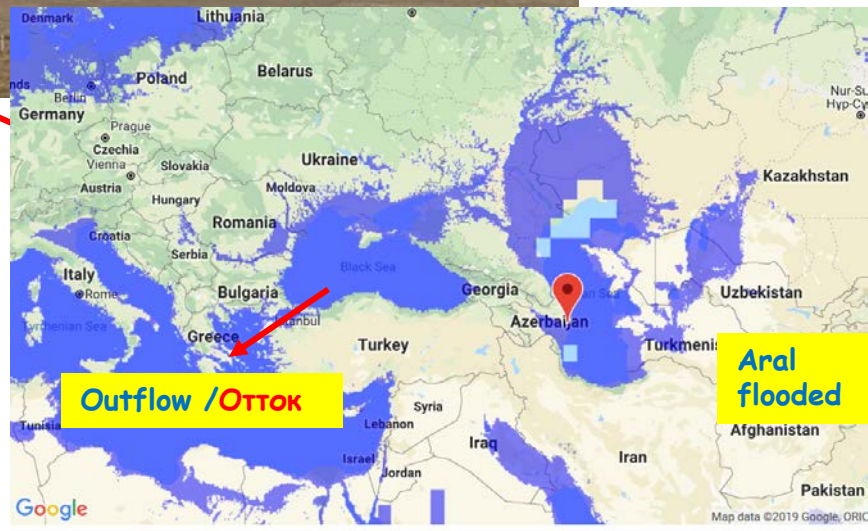


Erosion starts here at 152m / Эрозия начинается здесь на 152m

BK Flood Levels in Context

ВК Уровни наводнений в контексте



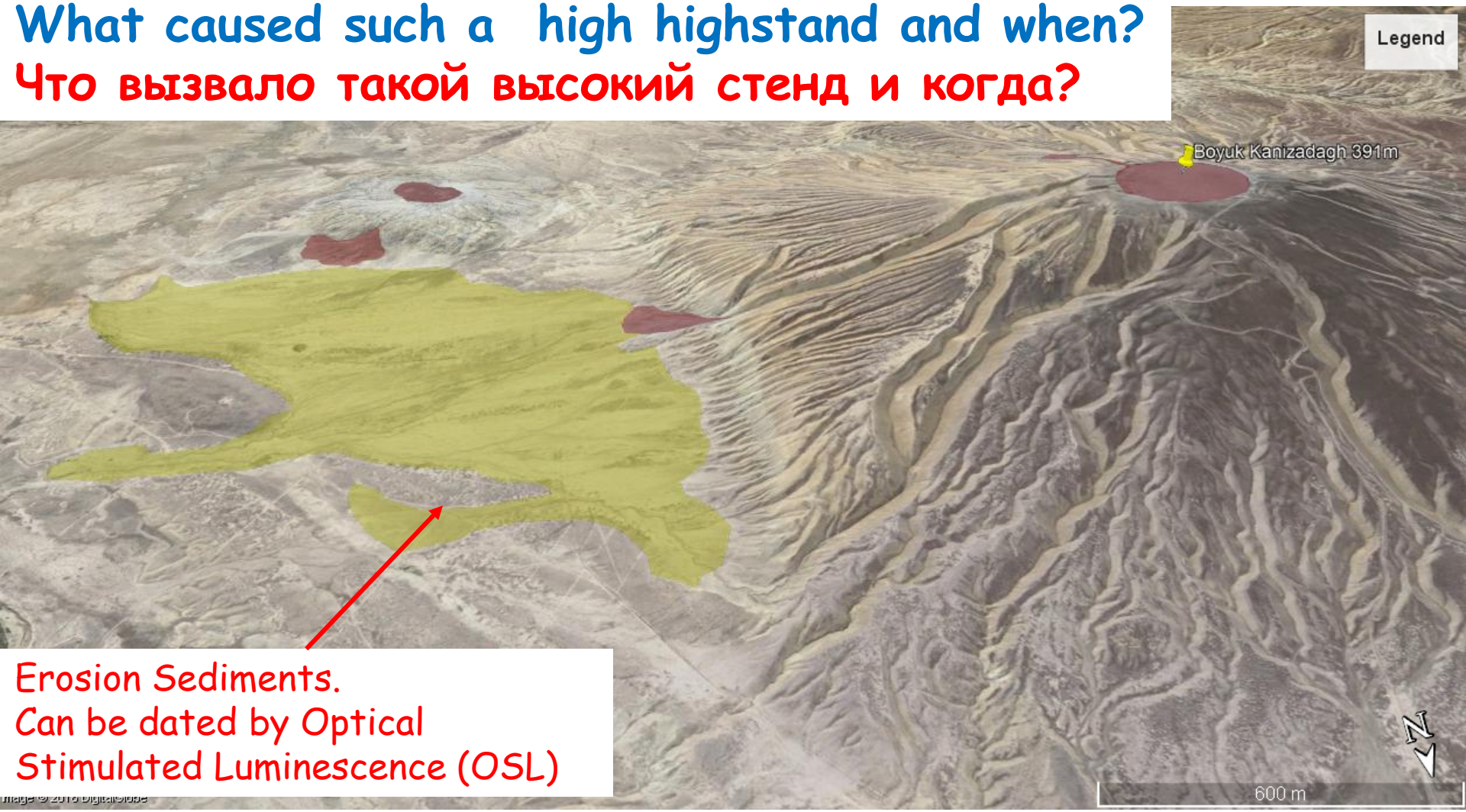


Large inland Sea/Lake
Drainage via Bosporus
Aral flooded

Дренаж через Босфор
Арал затоплен

B.K. Erosion Sediments Эрозионные отложения

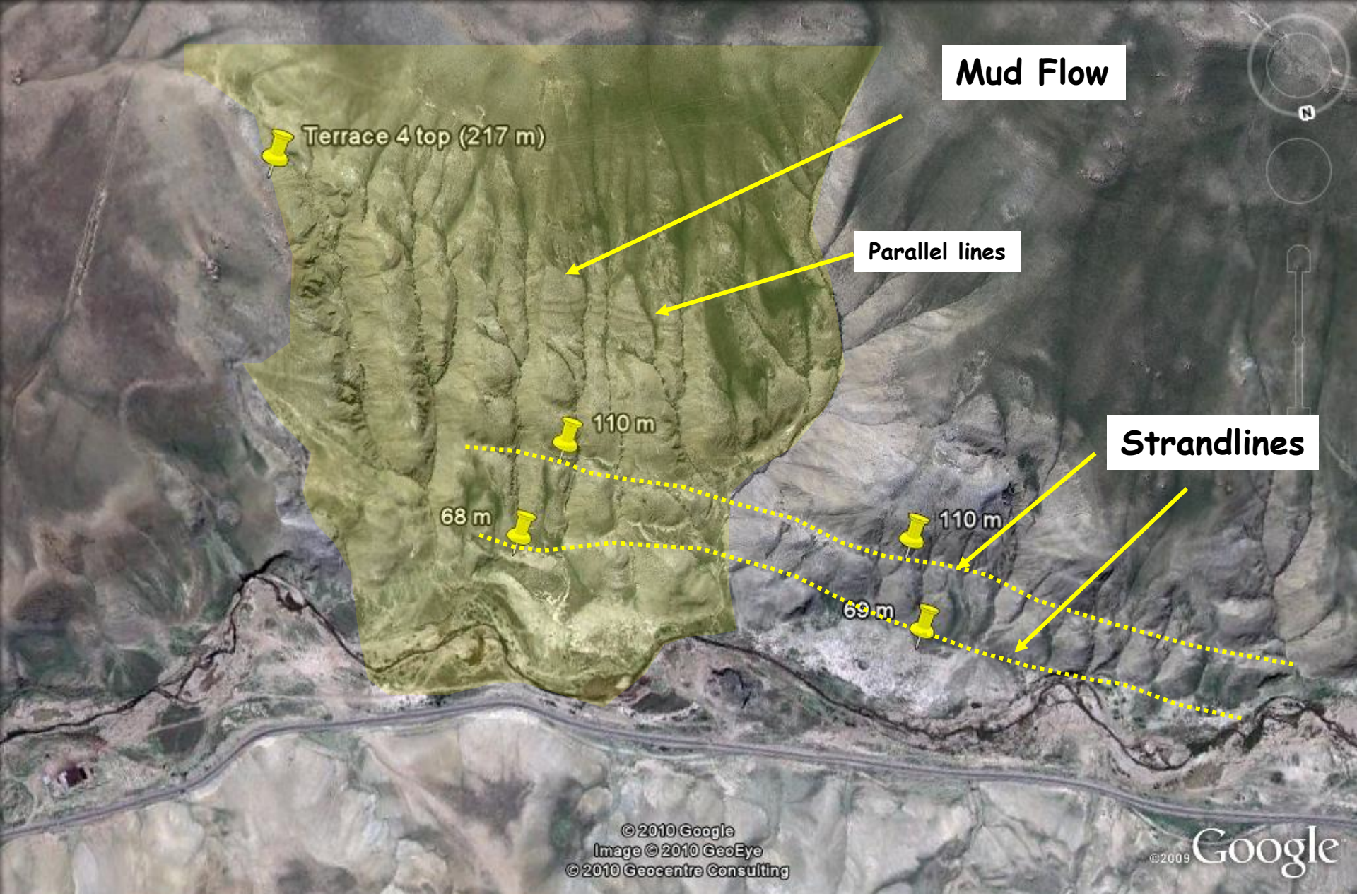
What caused such a high highstand and when?
Что вызвало такой высокий стенд и когда?



Erosion Sediments.
Can be dated by Optical Stimulated Luminescence (OSL)

Deductions.

- Caspian Sea highstand was above 75m asl, possibly up to 150m asl.
- Temporary deluge,-Временное наводнение



Strandlines at Gilazi Valley Entrance, similar to BK

Strandlines на входе долины Гилази, похожий на BK

110 m Strandlines. Mini terraces at Gilazi Valley Entrance

Terracing is caused by transgression – Limited Duration

Strandlines need an explanation

Strandlines нуждаются в объяснении

Need more evidence

Нужно больше доказательств

222m asl

Can the 222m Gilazi strandline be found elsewhere else ?

Yes

From the Mud Volcano Davilidagh, near Sangachal

Может 222m Gilazi нить найти в другом месте?

Да

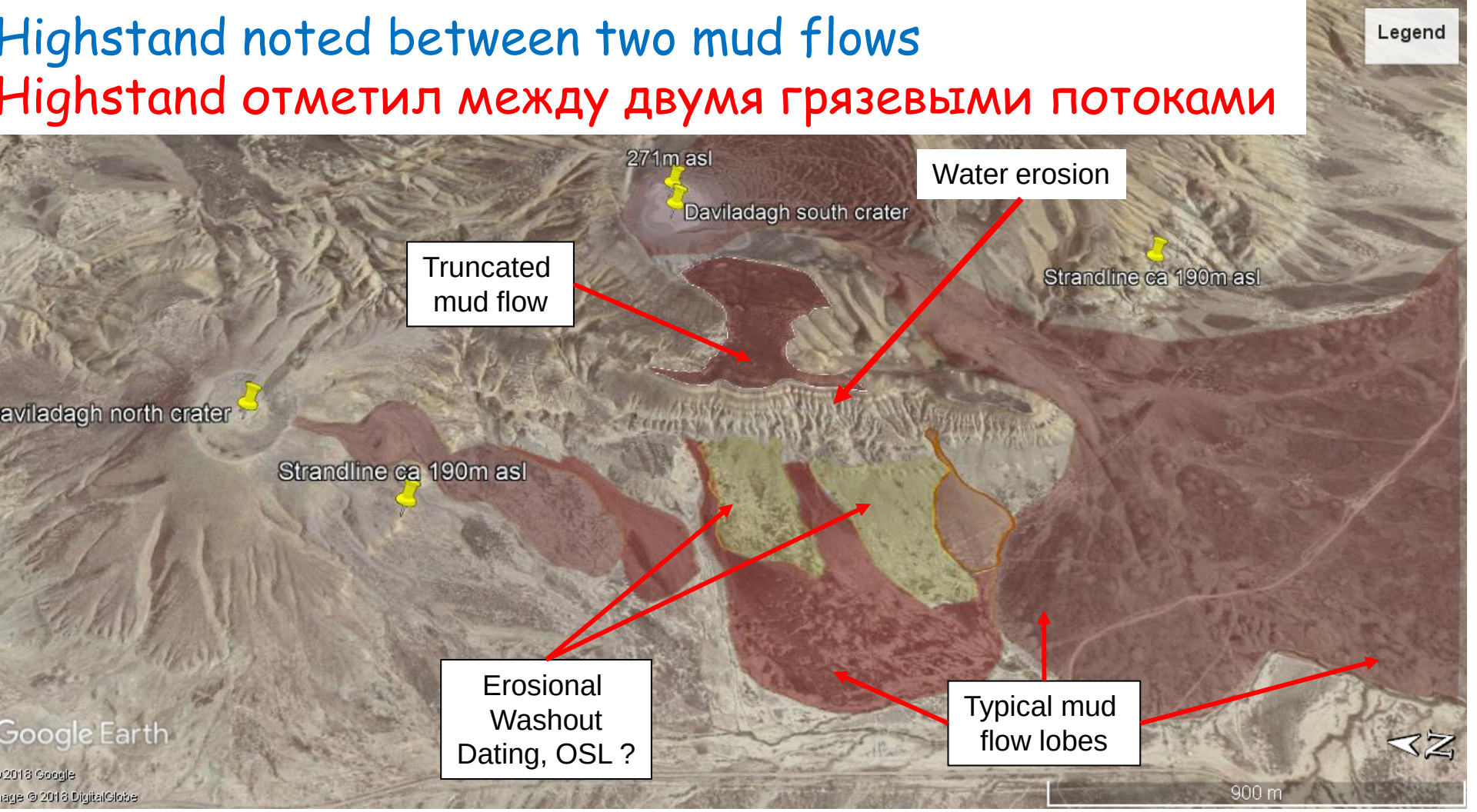
Из грязевого вулкана Давилида, вблизи Сангачал

Davilidagh Mud Volcano near Cheyildagh

Satellite Image of Davilidagh Mud Volcano

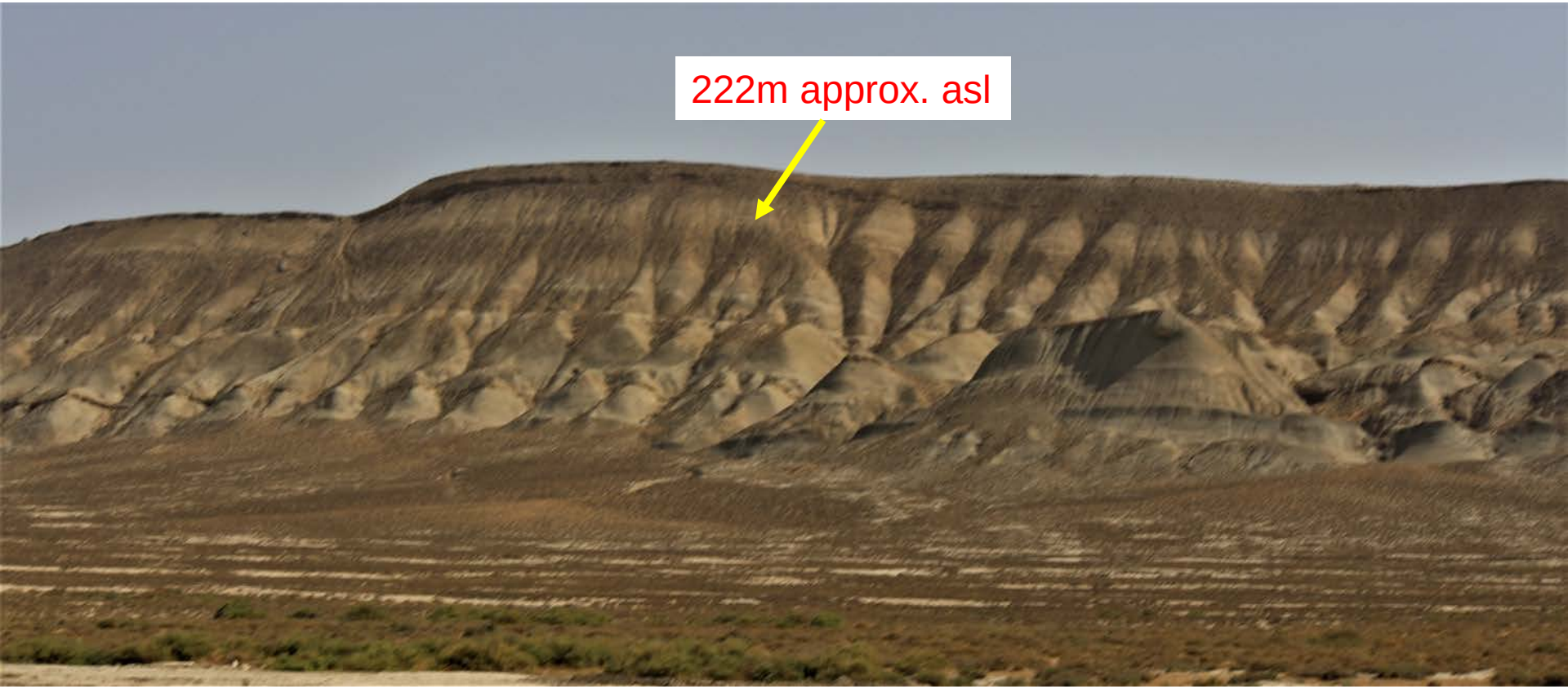
Спутниковое изображение грязевого вулкана Давилидаг

Highstand noted between two mud flows
Highstand отметил между двумя грязевыми потоками



Implication – Caspian Flood is Geologically recent
Последствия - Каспийский паводок является геологически недавним

Front view of Davilidagh erosion

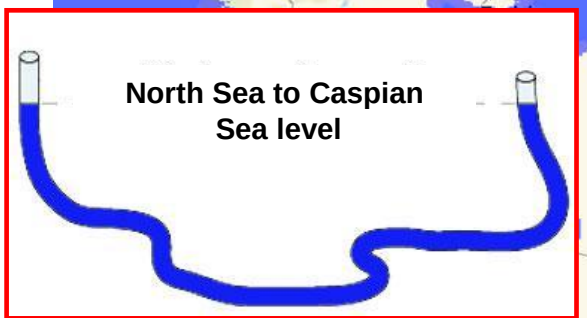


GIA, Dr. Aliyav of Mud Volcano Lab agrees that a Caspian highstand caused erosion
ГИА, д-р Алияв из Mud Volcano Lab согласен с тем, что каспийская высокая стойка вызвала эрозию

Needs to be studied
Нуждается в изучении.

What Eurasia looks like with a flood level of 222m

Как выглядит Евразия с уровнем наводнений в 222 м.



Implication – There was a catastrophic marine flood

Последствия - Было катастрофическое морское наводнение

Evidence of Freshwater flooding up to the last glacial maximum

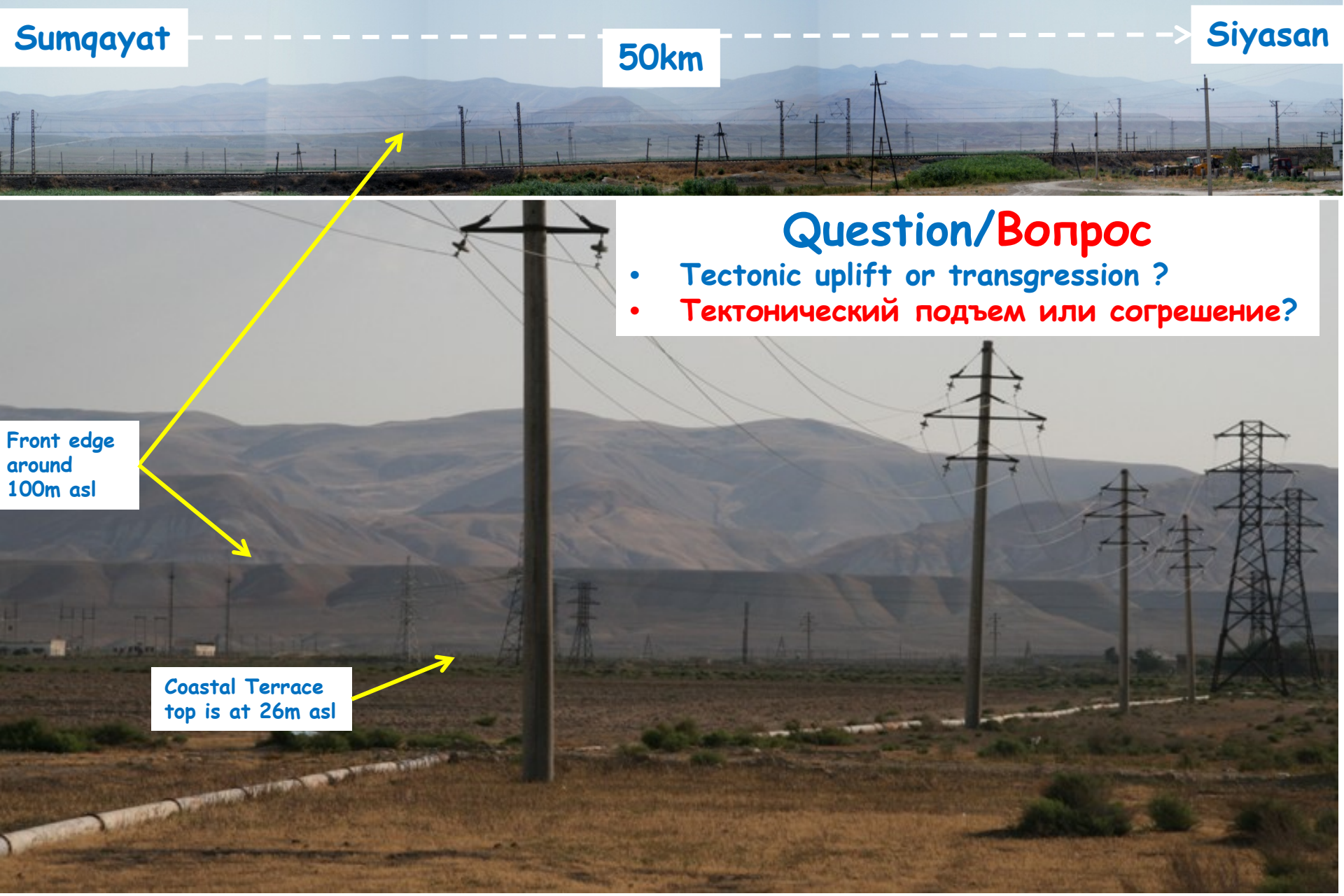
Доказательства затопления пресной воды до последнего ледникового максимума

Focus on extensive raised terraces

Сосредоточьтесь на обширных поднятых террасах

Extensive Raised Terrace near Gilazi. Protracted high level

Обширная поднятая терраса около Gilazi Затяжной высокий уровень



Question/Вопрос

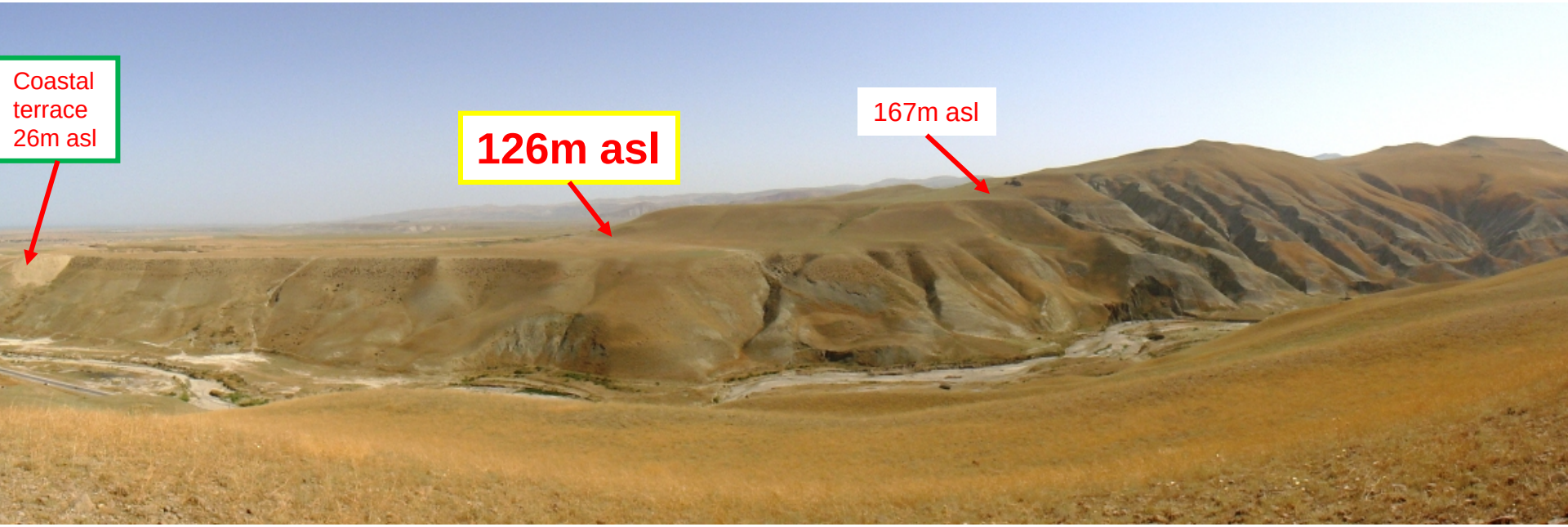
- Tectonic uplift or transgression ?
- Тектонический подъем или согрешение?

Siyazan Terrace in Profile / Сиязан Терраса в профиль

Dominant deep raised terrace (700m)
Implies longer exposure to Caspian wave action

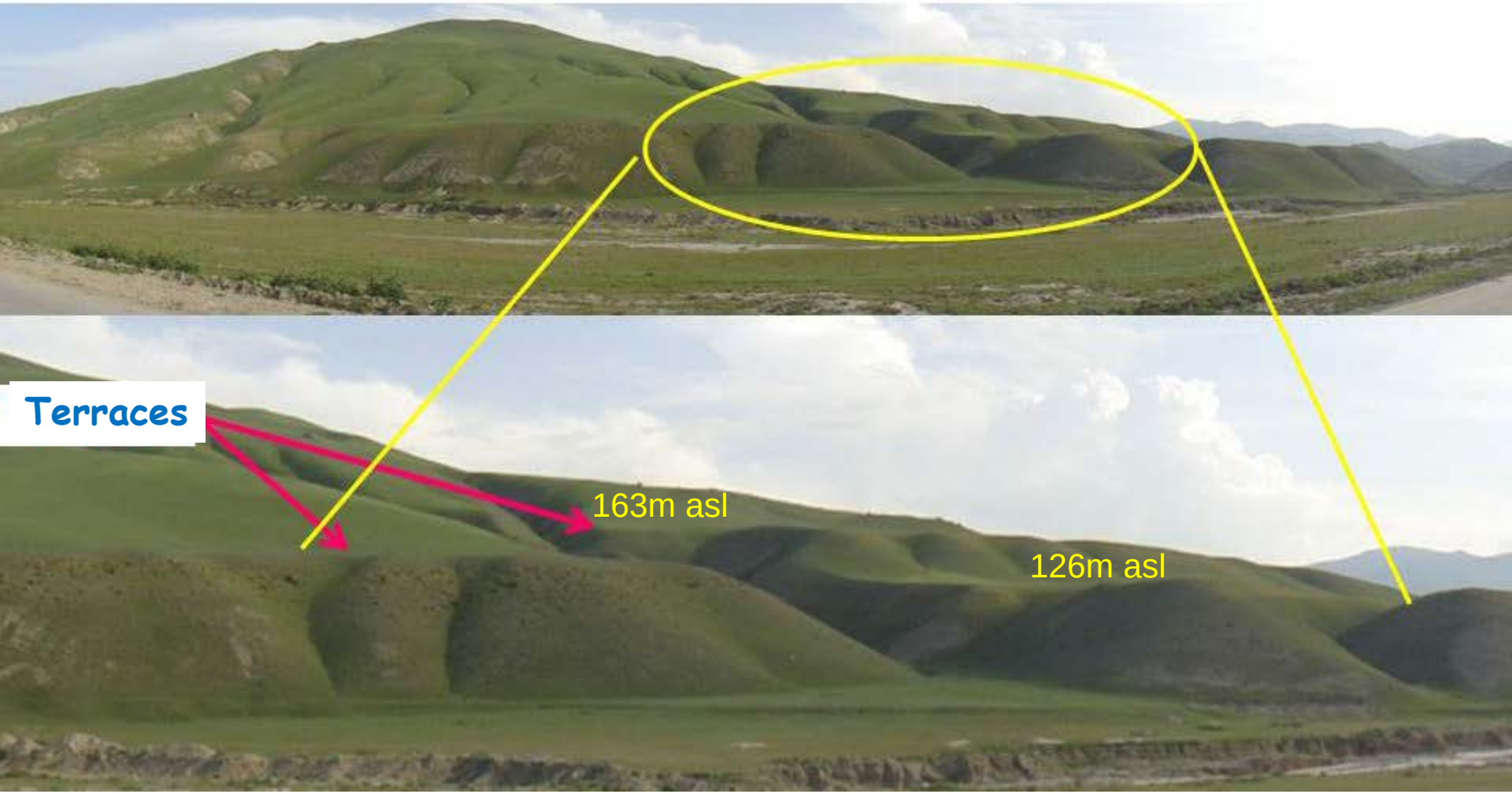
Доминирующая глубоко поднятая терраса (700м)
Подразумевает более длительное воздействие каспийских волновых действий

Gilazi Valley Staircase Terracing



Strandlines and terracing means massive transgressions

NOT TECTONIC UPLIFT !



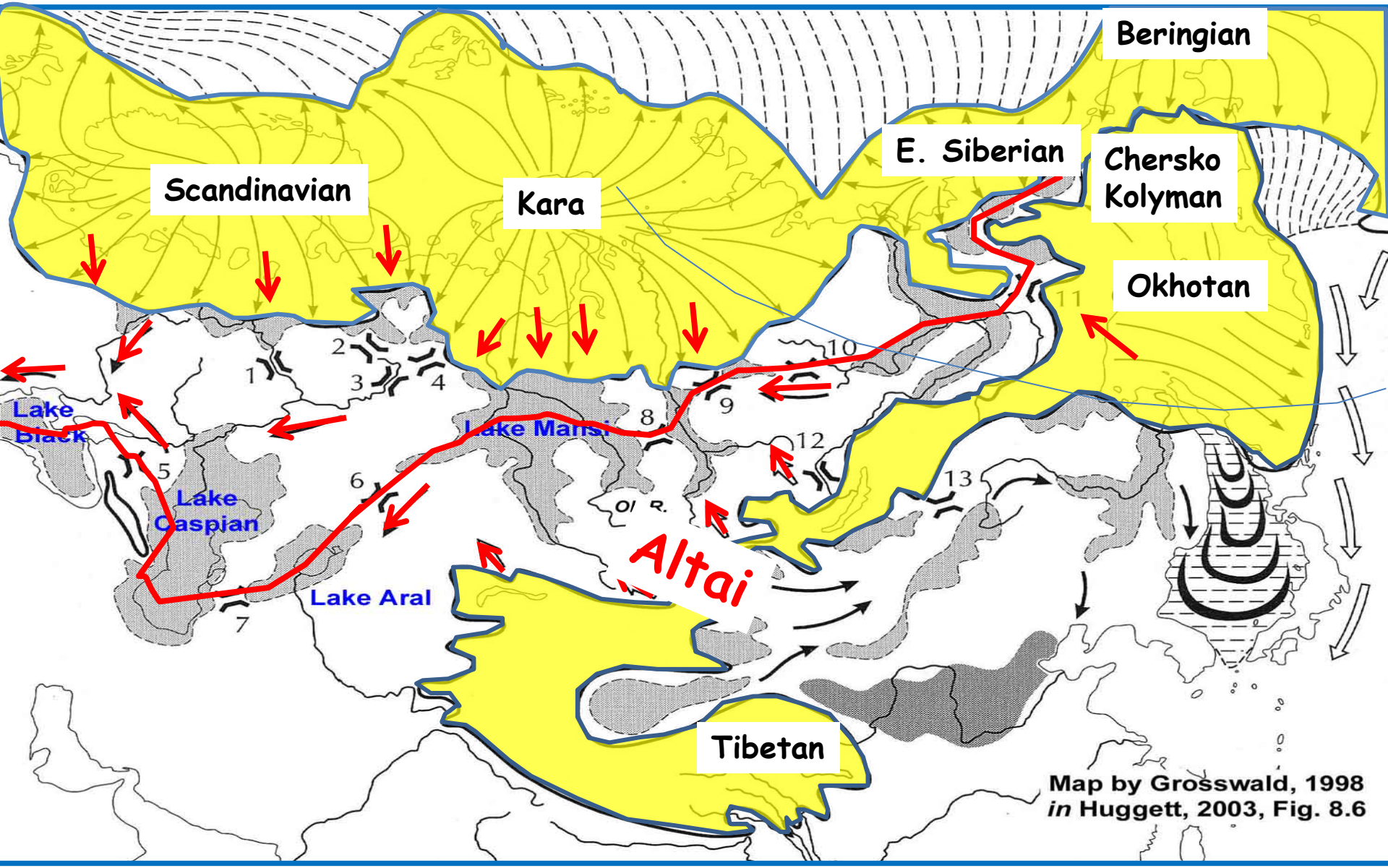
Gilazi Valley Terracing

Where did the water come from and how was it contained?

Откуда взялась вода и как она содержится?

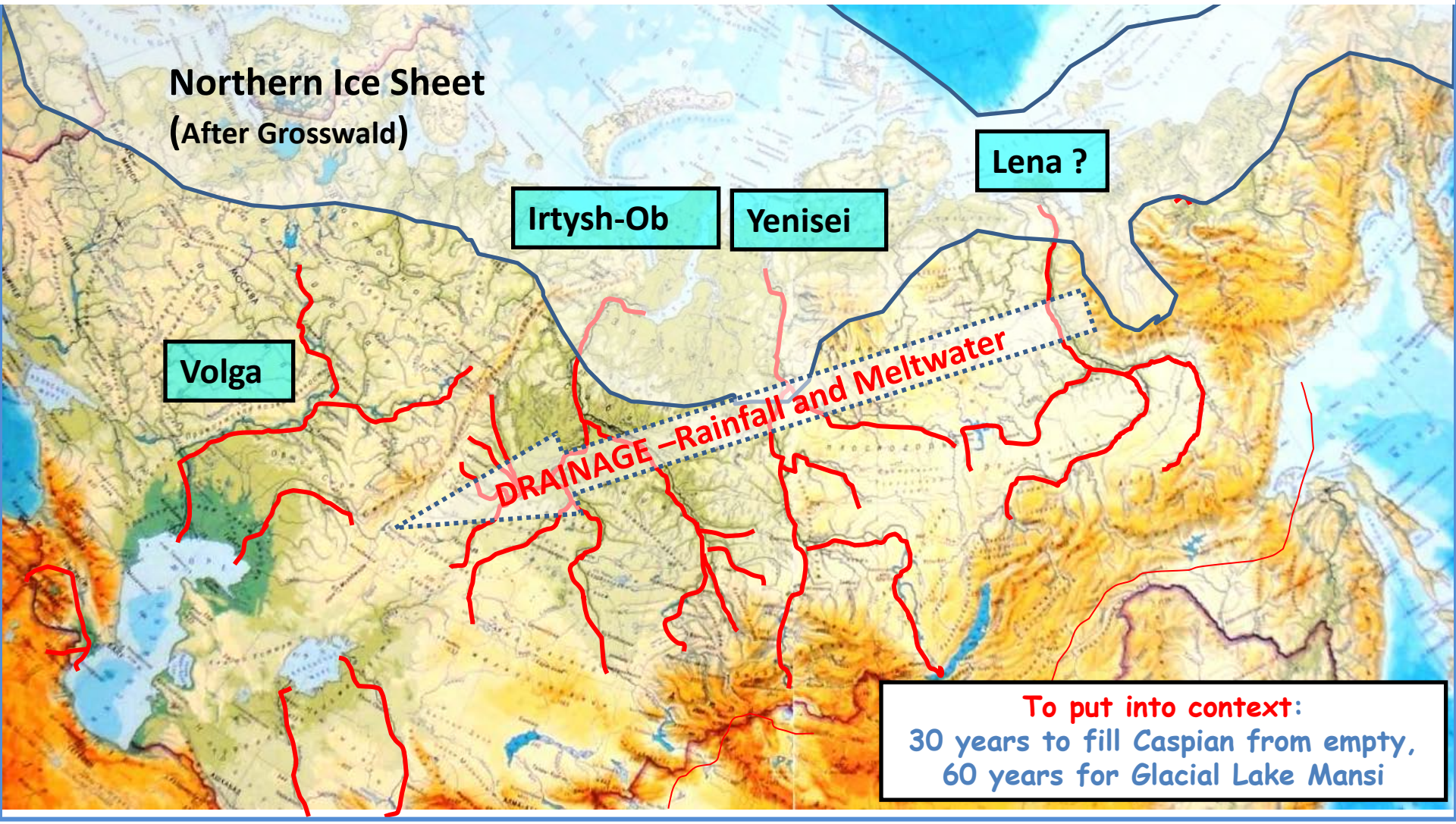
Scientists focus on drainage from glacial meltwater flow and proglacial lakes

Ученые сосредотачиваются на дренаже из ледниковых талых вод и проледниковых озер

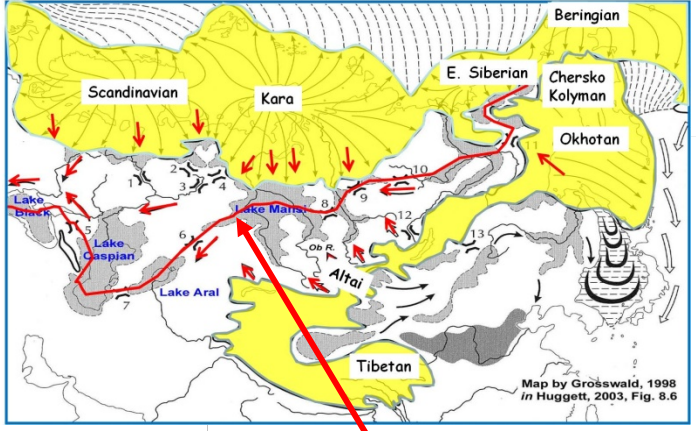


Need to Consider Rainfall/ Необходимо рассмотреть осадки

All rivers rivers approx. Все реки рек около. 2041 km^3 pa

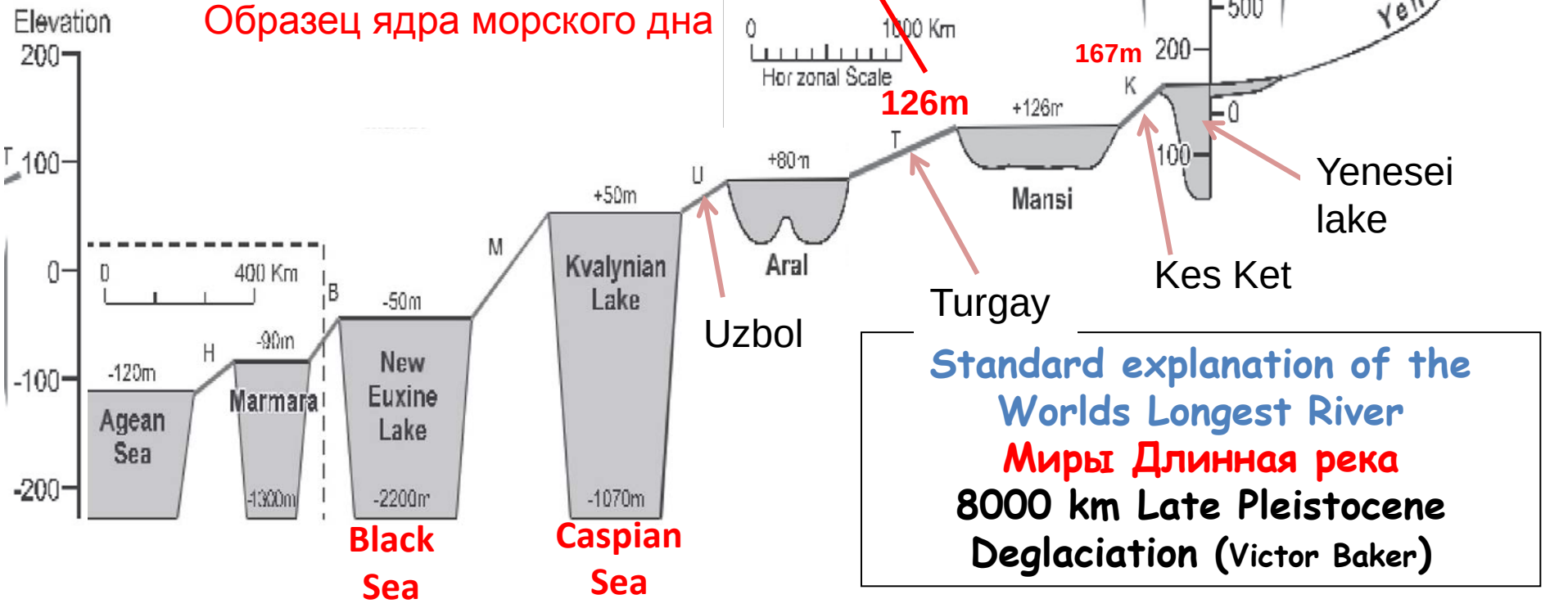


Where did the water go? / Куда ушла вода?



Sea bed core sample

Образец ядра морского дна



Standard explanation of the Worlds Longest River

Миры Длинная река

8000 km Late Pleistocene Deglaciation (Victor Baker)

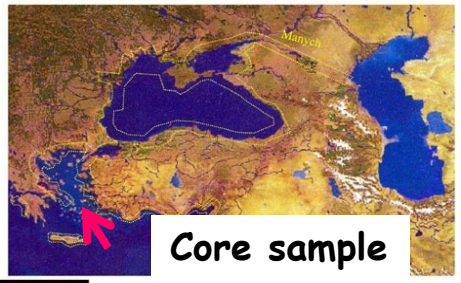
But…there is a problem with the model.It assumes full discharge to the Aegean, did not happen !

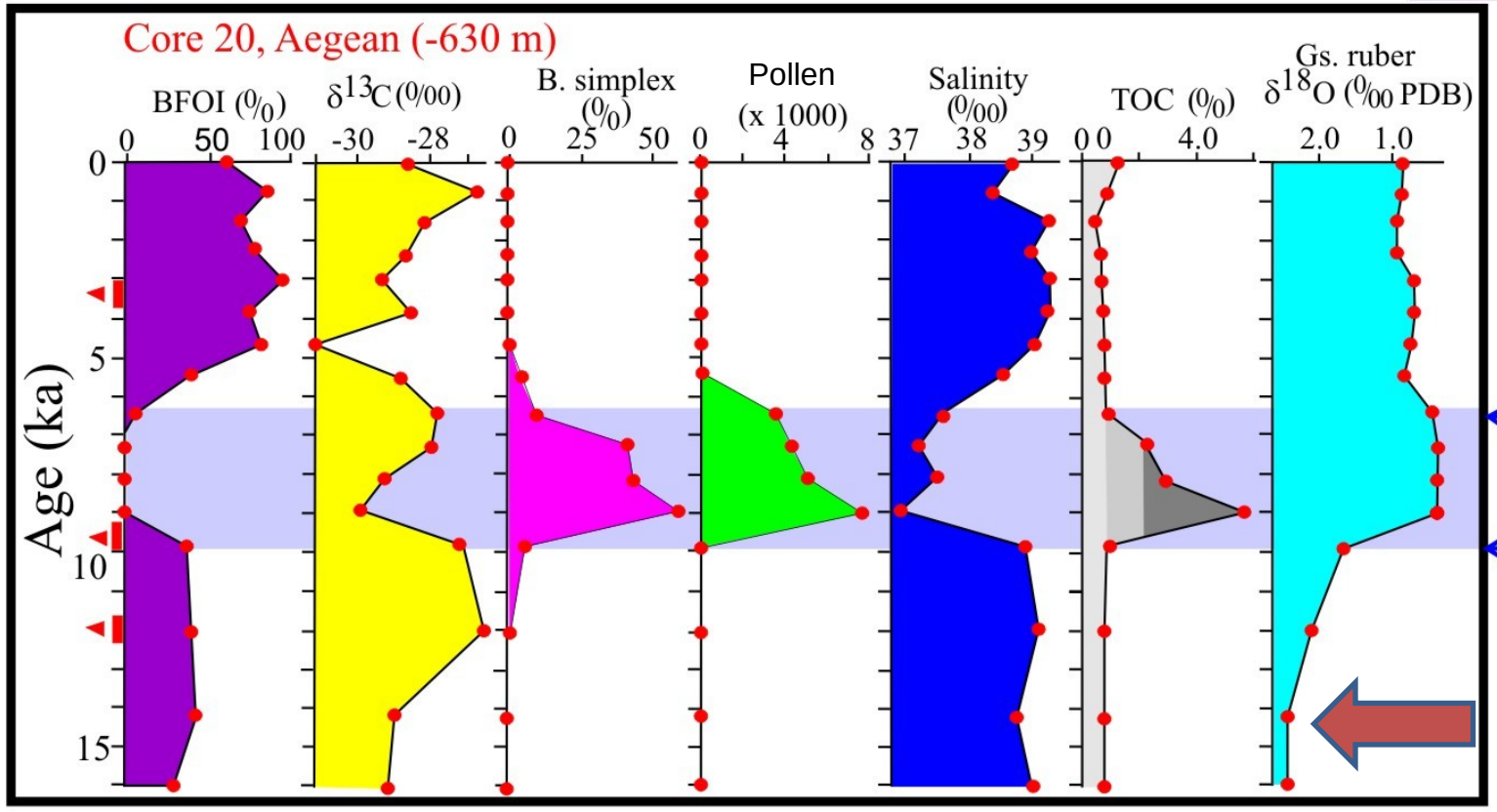
Но... есть проблема с моделью.

Он предполагает, что полная разрядка в Эгейском море, не произошло

Discharge Record from Black Sea

Aegean Core Sample - Depth 630 m

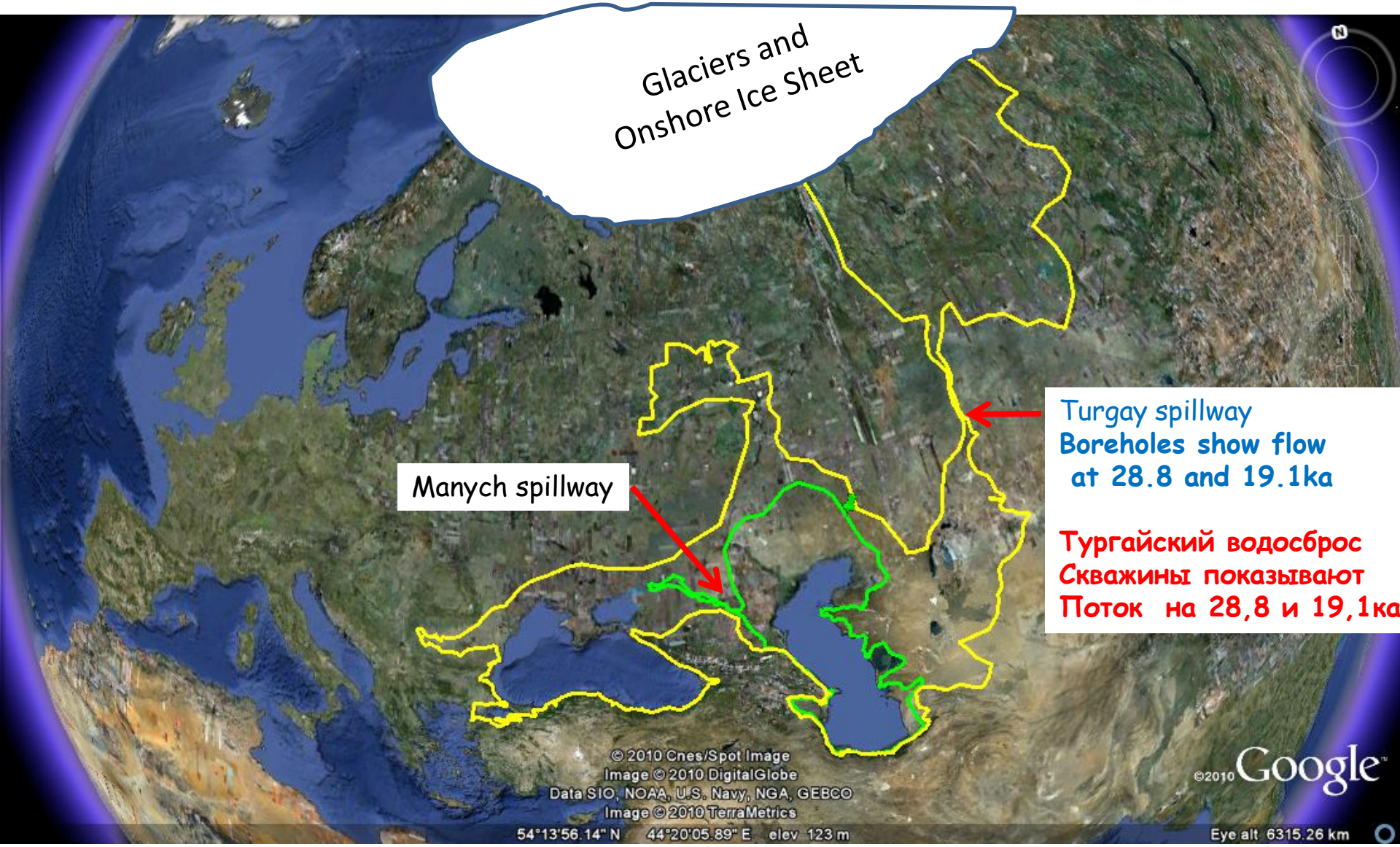




Sediment Core Indicators Showing Holocene outflow into the Aegean Sea
ca 10,000 to 6,500 years BP
Source: Aksu et al.

Bosporus Opens 10,000 yrs. Confirms massive Eurasian lake /
Босфор открывает 10000 лет. Подтверждает массивное евразийское озеро

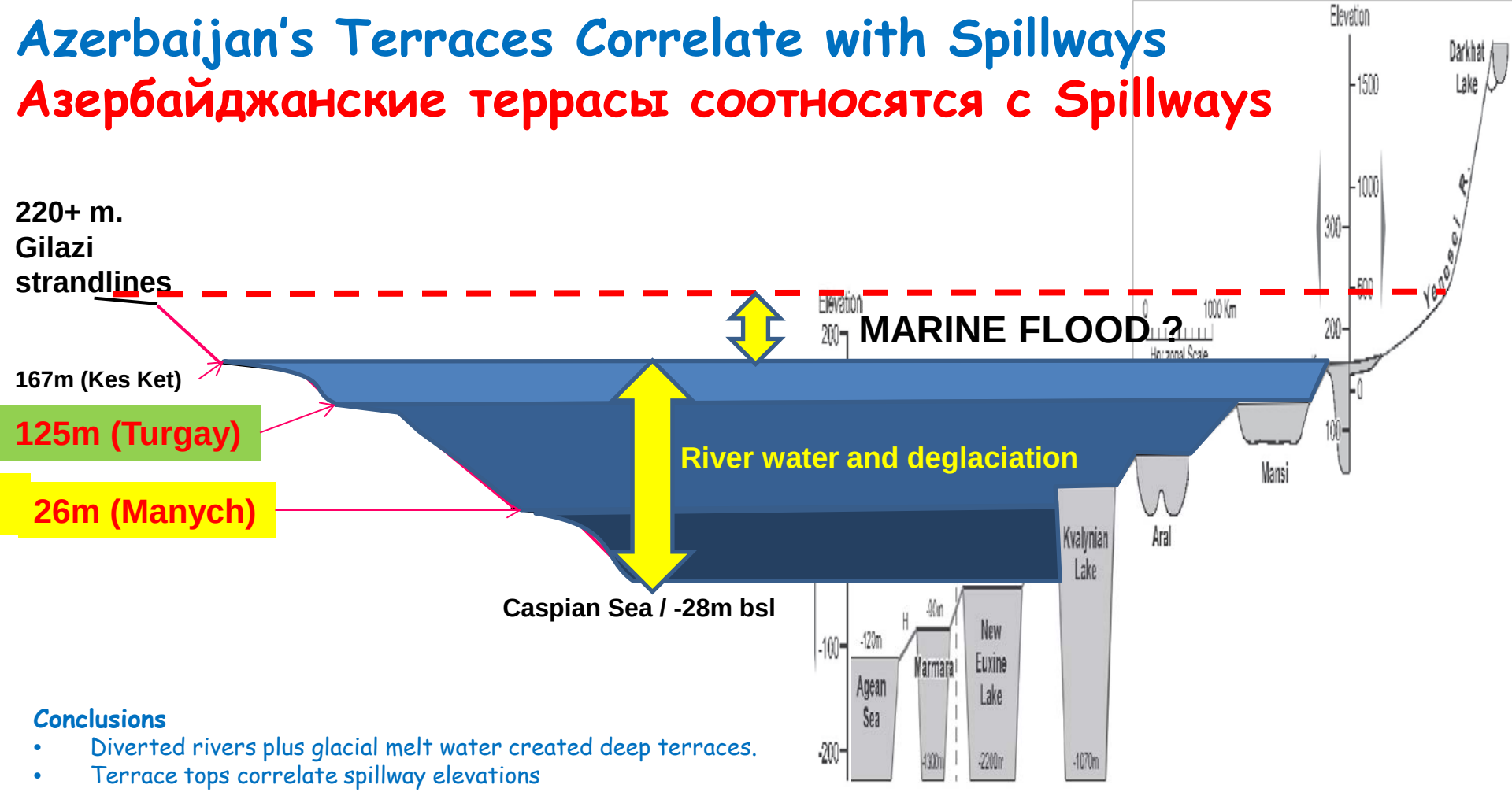
Extent of Late Pleistocene ENDORHEIC lake - 126m asl.



126m contour line (Yellow) and 26m (Green), corresponds with Turgay and Manych Spillover levels.
126м контурная линия (желтая) и 26м (зеленый), соответствует уровням Turgay и Manych Spillover.

Azerbaijan's Terraces Correlate with Spillways

Азербайджанские террасы соотносятся с Spillways



Conclusions

- Diverted rivers plus glacial melt water created deep terraces.
- Terrace tops correlate spillway elevations
- Arctic onshore ice dams, Eurasian topography and the Bosporus land bridge contained waters from draining to the Aegean Sea.
- Freshwater discharge cannot explain the 222m asl strandline.

Выводы

- Отвлеченные реки плюс ледниковая талая вода создали глубокие террасы.
- Террасные вершины коррелируют высоты водосброса
- Арктические береговые ледовые плотины, евразийская топография и Босфорский сухопутный мост содержали воды от слива в Эгейское море.
- Сброс пресной воды не может объяснить 222m asl strandline.

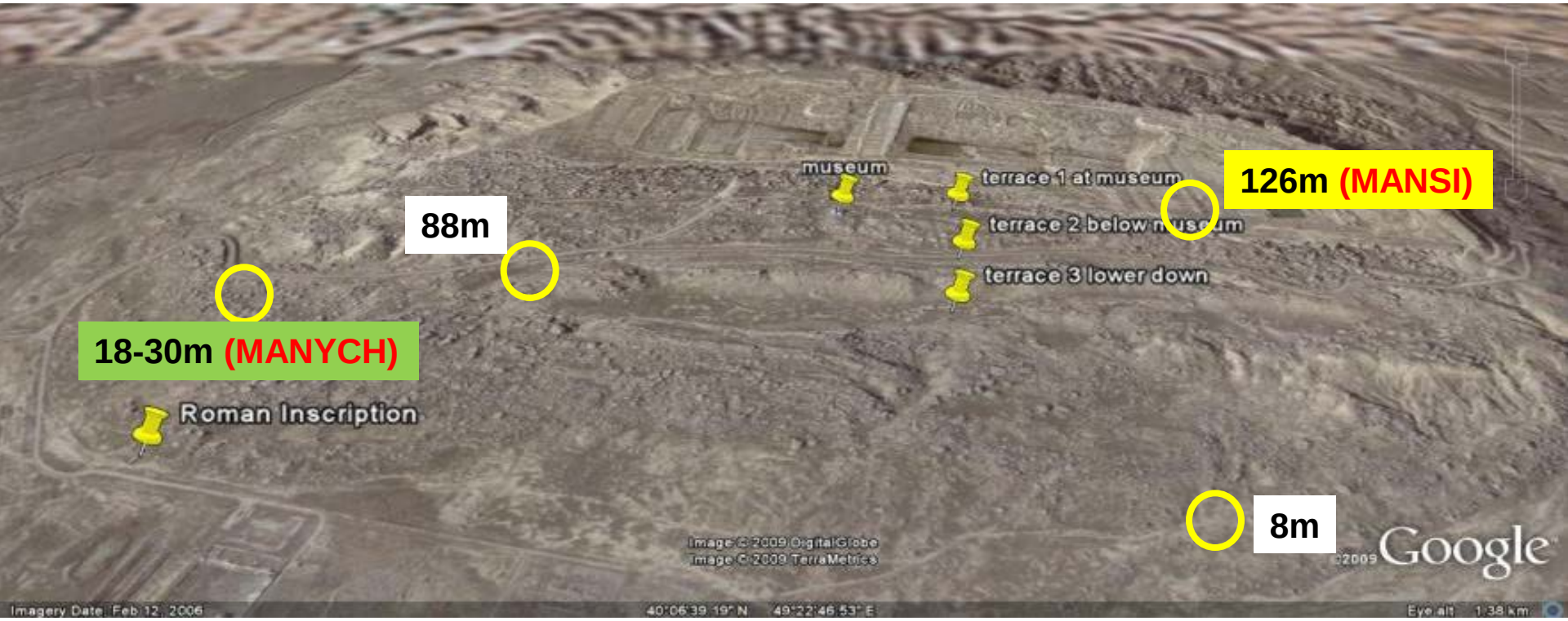
Proof of Flooding

Radiocarbon Dating in the Caspian and Black Lakes

Радиоуглеродные знакомства в Каспийские и Черные озера

Elevation Above Sea Level (m)	Conventional Age
126	17,210+/-100
88	14,750 +/- 80
18 -30	28,952+/-220
8	26,560 +/- 190
** 100	32,910+/-510

Beta Analytic - Florida



Bulk Mollusk Sampling Locations at Gobustan (Boyukdash)

Kavarna Terraces / Bulgaria

Thracian Cliffs Golf Course.

Каварна Террасы / Болгария

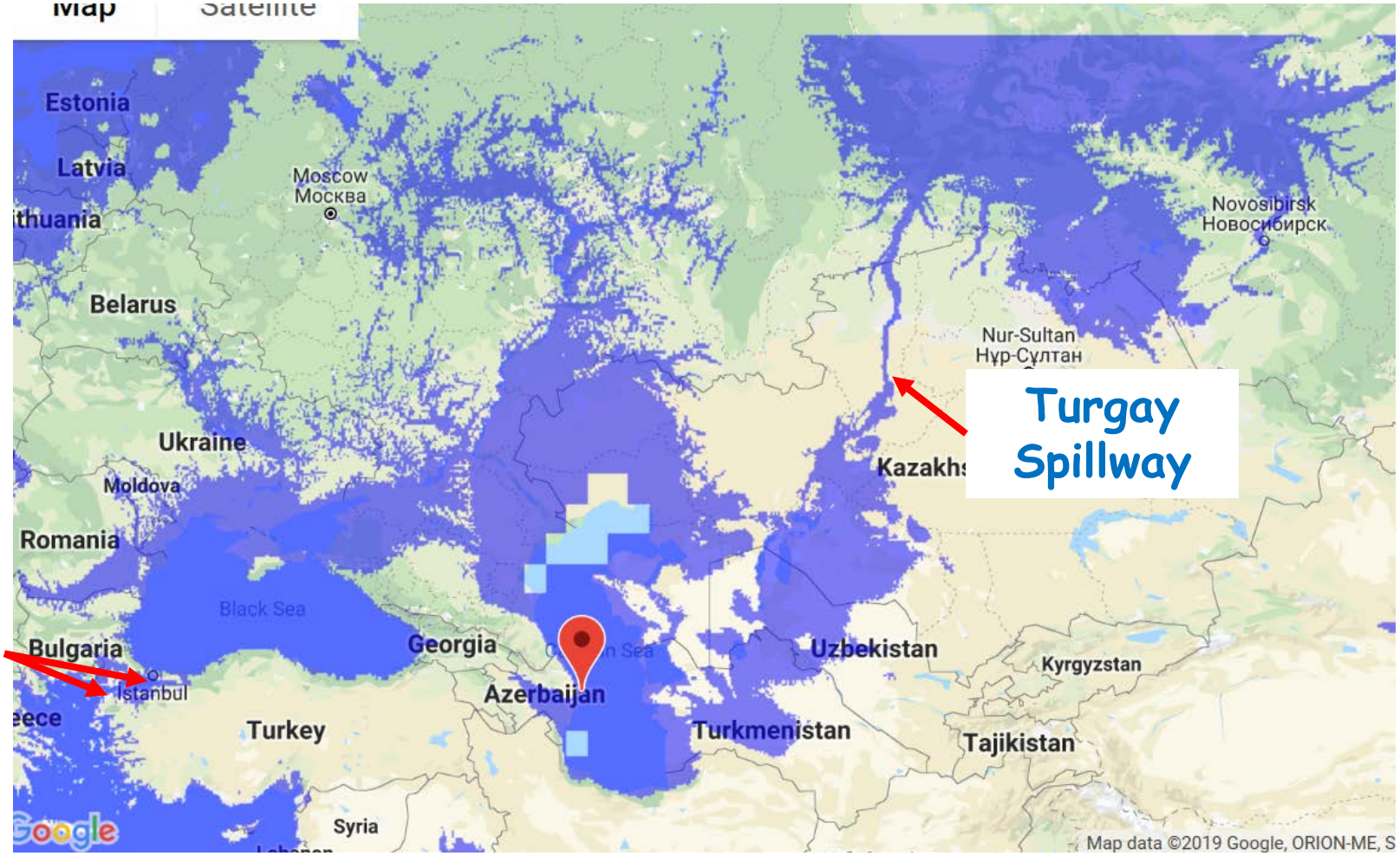
Фракийское поле для гольфа скалы

Summary of Radiocarbon Dating of Mollusc Samples
Резюме радиоуглеродных датировка образцов Моллюска

Data Indicates Prolonged Ice Age Flooding
(i.e. some 12,000 years in excess of 120m a.s.l)
Данные указывают на длительное наводнение ледникового периода
(т.е. около 12 000 лет свыше 120 млн.л.)

Scale of Eurasian Lake with 125m Pleistocene Highstand

Масштаб Евразийского озера с 125-метровой плейстоценовой высотой



Implication. Black Sea to Mediterranean is a limited discharge spillway.

Последствия. Черное море в Средиземное море является ограниченным водосбросом

What impacts would the marine and Ice Age flooding have?

Какие последствия окажет наводнение морского и ледникового периода?

Some Marine Flooding Implications

Geophysical

- Strandlines / erosion
- Large hydraulic impacts
- Sandwaves
- Haloclines
- Tsunami erratics
- Saltlakes established
- Earthquakes
- Reduced water temperatures
- Sediment transport

Biological

- Alien species introduced/displaced species
- Decline in freshwater species
- Increase in euryhaline

Water Chemistry

- Salination
- Marine isotopes

Climatic

- Increase rain/moisture

Human

- Flood victims
- Displaced people
- Rock art records
- Myths and legends

Problematic Issues / Проблемные вопросы

Palaeolithic settlements elevated

Giant Flood scars

Chocolate Clays

Baer Knolls 9,600 +/-500 years BP

Sandwaves. Nikiforov / Putans

Salinity ?

Alluvial Loess ?

Salt Lakes/regional

Refugia ?

Giant Landslides Ustyurt Platea. Torysh spheres

Mytilus edulis/ galloprovincialis??

Ostracod increase with salinity 9720 yr BP

Cerastoderma glaucum 9,000–8,500 BP

C. glaucum 6000 BP

Bosporus opens 10000 yr BP

Diluvial Erratics **ESTONIA?**

Water Chemistry, 9400 BP
- $^{87}Sr/^{86}Sr$ carbonate,
- brackish fauna shell hash
- peat deposits, 9500BP
- euryhaline (marine) fauna

Kyzylord antidunes Glacial dam collapse?

Rock Art
- Whales,
- Guillemot
- Stone Age Map.

Low temperatures Sapropel Holocene outflow 10000 – 6500 y BP

Troy Bay Holocene sediments

Sapanca corridor

Iznik Beachrock

Raised terraces

Varves ?

Biodiversity
- Poor
- Little life below 100m

Other
- Migrations
- Egyptology/Culture
- Caucasian ancestry
- Flood legends

Strandlines BK Halocline

Mysis Shrimp evolved during ice ages. Arctic sp.

Marine Flood explanation

Ice Age Flood explanation

English Channel Canyon

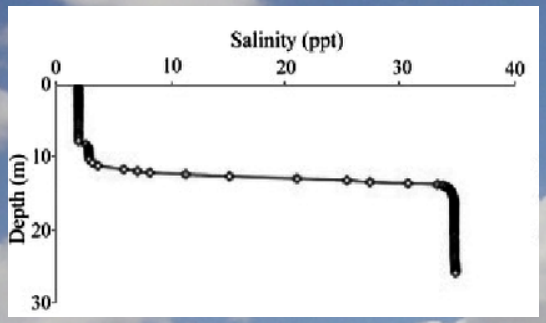
Mammoth flood trauma

Caspian and Baikal Seals Recurring floods.

Some Examples

Некоторые примеры

BK Halocline/ Халоклин



Note: broad strandline due to wave action

Sharp interface
Suspected Halocline
Острый интерфейс
Подозреваемый Halocline

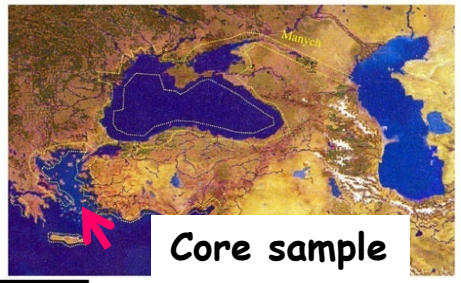
Needs to be investigated

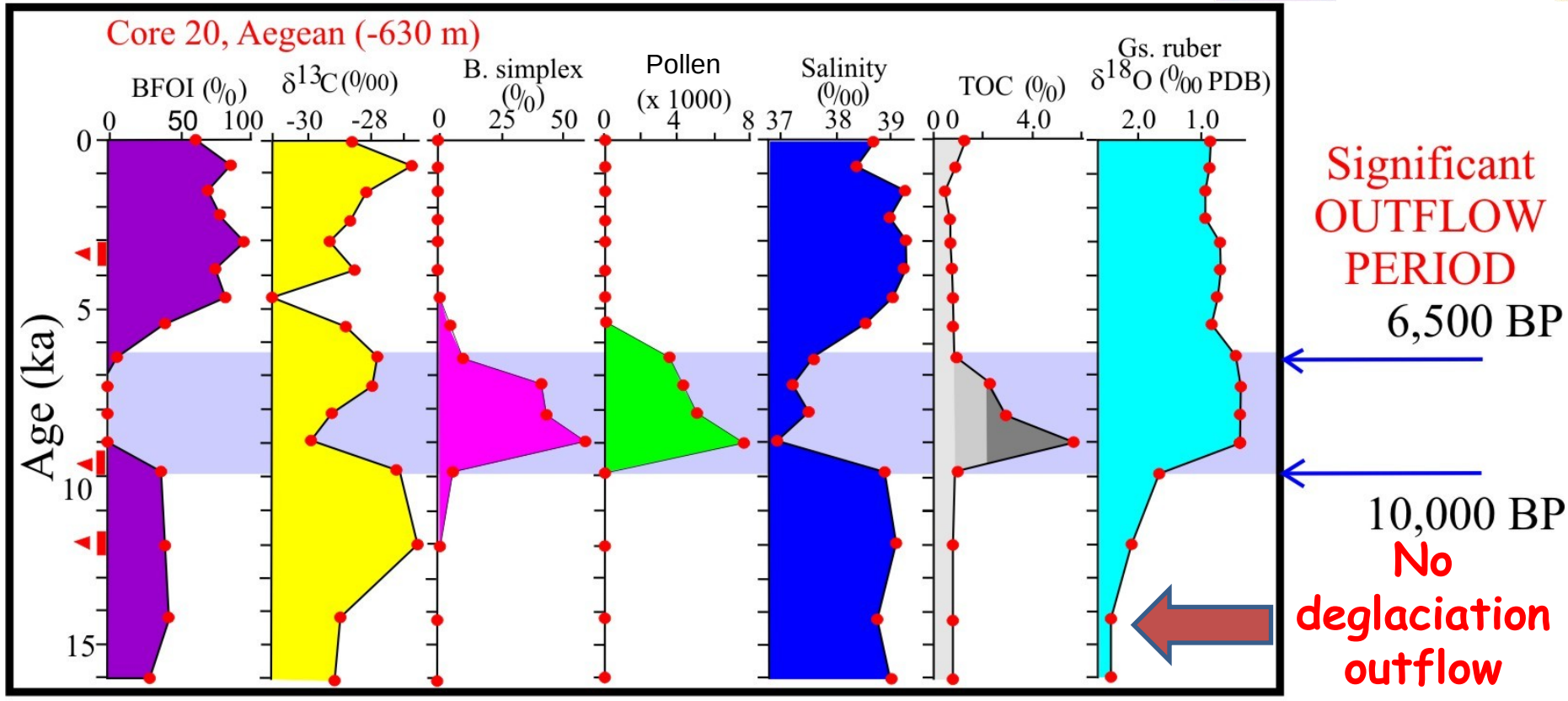
Sea water entering Caspian lake should generate a Halocline - an interface between fresh and saltier water

Морская вода, попадающая в Каспийское озеро, должна генерировать Halocline - интерфейс между пресной и соленой водой

Discharge Record from Black Sea

Aegean Core Sample - Depth 630 m





Sediment Core Indicators Showing Holocene outflow into the Aegean Sea
ca 10,000 to 6,500 years BP
Source: Aksu et al.

Ostracods as Palaeosalinity Indicators
Остракоды как показатели палеосальности

Ostracod-Based Paleoreconstructions on the Northern Caspian Sea Shelf during the Holocene.

Палеореконструкции на шельфе Северного Каспийского моря во время голоцена

Checkovskya et al.

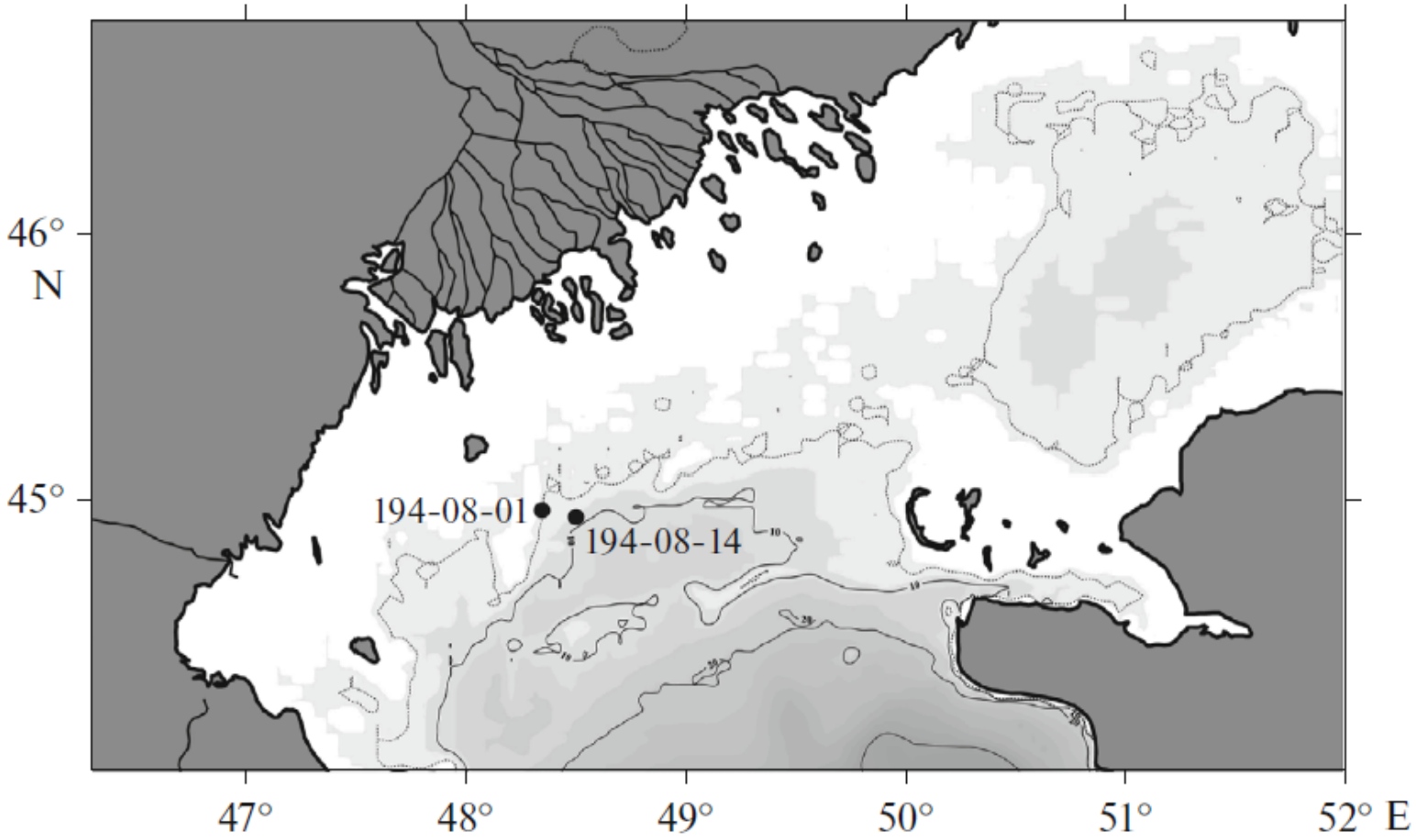


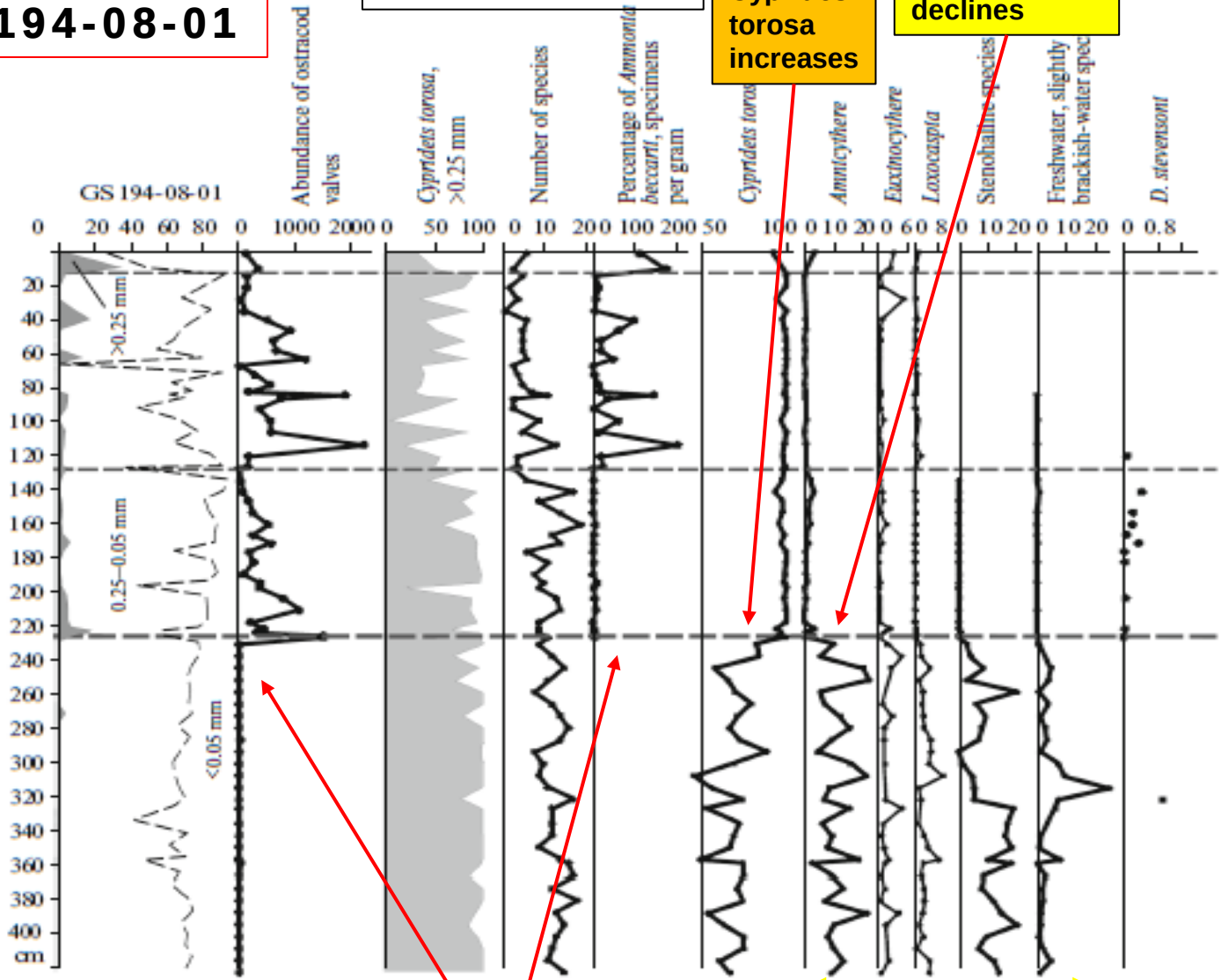
Fig. 1. Map of stations.

core profiles
GS **194-08-01**

Foraminifera Ammonium beccari increase

Cyprides torosa increases

Amnocythere declines



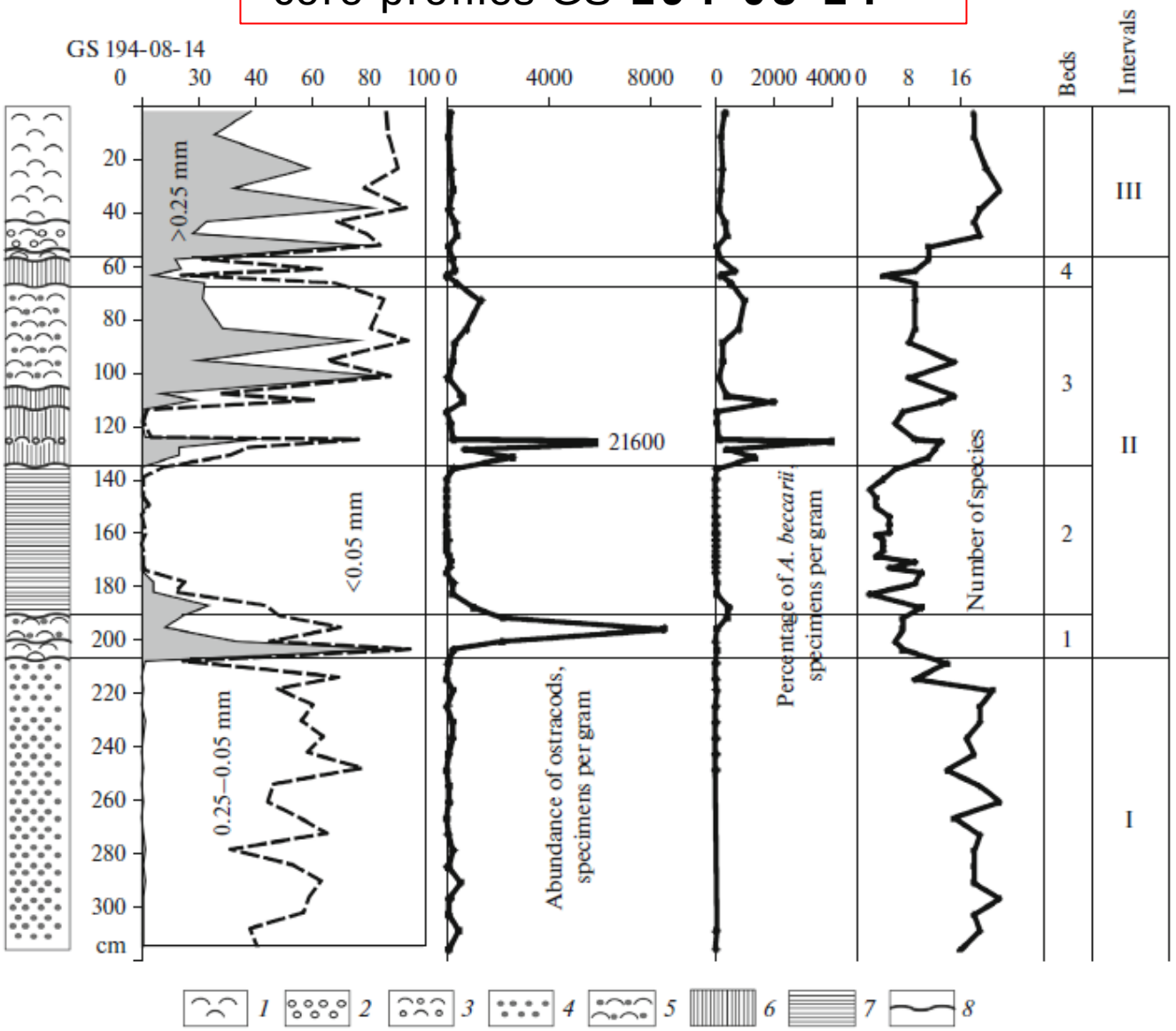
9720 yr BP Event

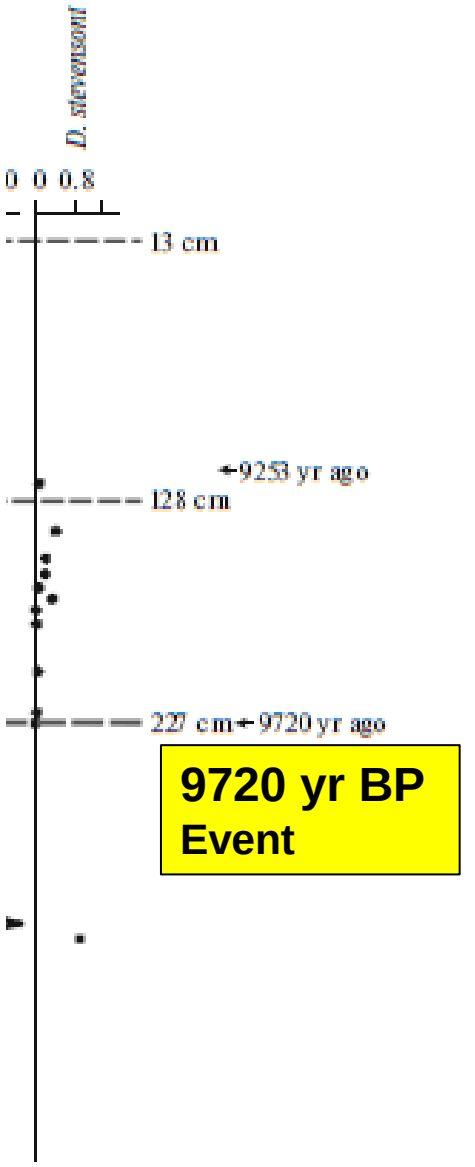
Fig. 2. Distribution of weight percentages of sediment fractions, ostracod assemblages, number of ostracod species, *A. beccarii*, and content of individual genera and ostracod species (%) in core profile GS 194-08-01.

Ostracod increase

Freshwater spp decline

core profiles GS **194-08-14**





9720 yr BP
Event

Fig. 3. Lithology, weight percentages of sediment fractions, ostracod distribution, number of foraminiferal species, including *A. beccarii* in core profile GS 194-08-14. (*1*) coquinoidal limestone; (*2*) aleuritic biogenic sand; (*3*) the same as (*2*) enriched with large detritus fragments; (*4*) terrigenous sand; (*5*) the same as (*4*) enriched with shell detritus; (*6*) clay soft, viscous; (*7*) compact clay; (*8*) boundary is sharp, uneven.

rd content of individual genera and ostracod

Marine Ingress around 9720 yr BP , Морская Ingress около 9720 год BP

Aral Sea Tier II Event / Аральское море Tier 2 Событие

Ian Boomer

% Cyprideis torosa

% Limnocythere

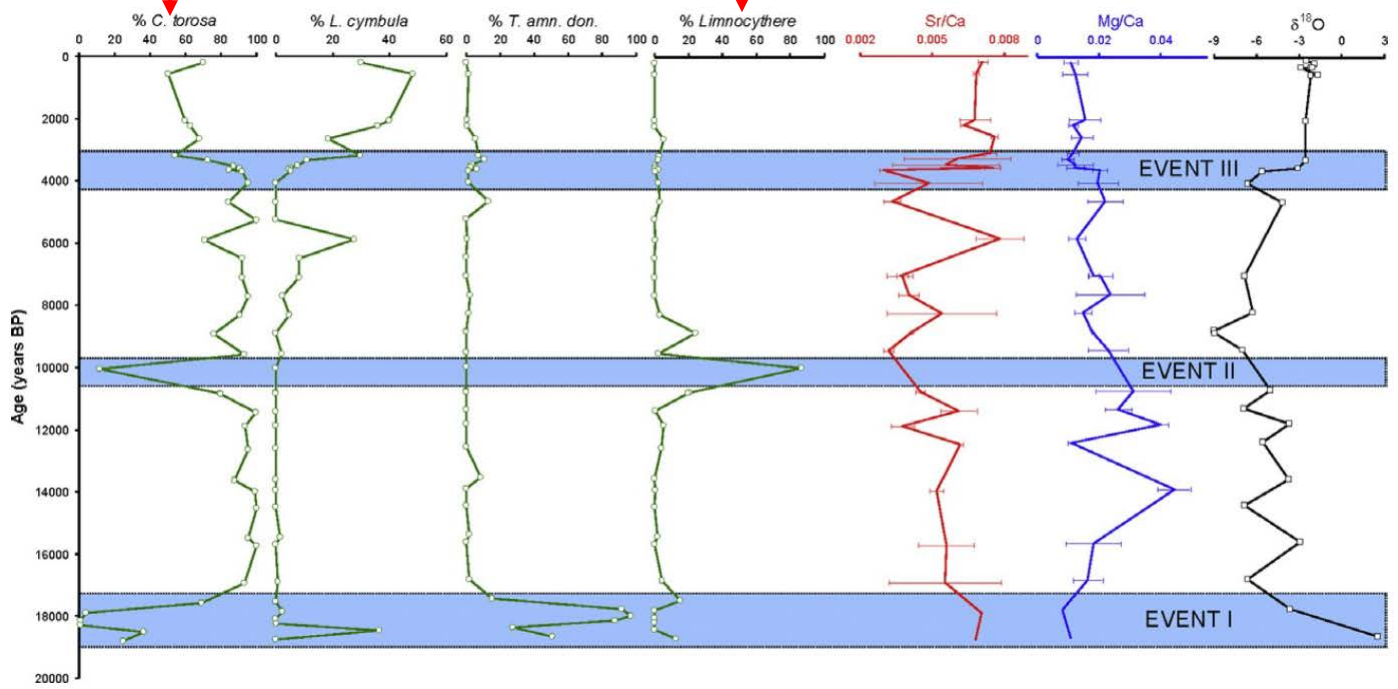


FIGURE 12.3 Aral Sea core AR01-3 showing changing faunal composition based on the four most abundant taxa (note *Limnocythere* includes *L. aralensis* and *L. inopinata*) together with a stratigraphical record of changing trace element chemistry (Sr/Ca, Mg/Ca and $\delta^{18}O$ of *C. torosa* shells).

Event II
10,000 yr BP

Marine Ingress around 10000 yr BP , Морская Ingress около 10000 год BP

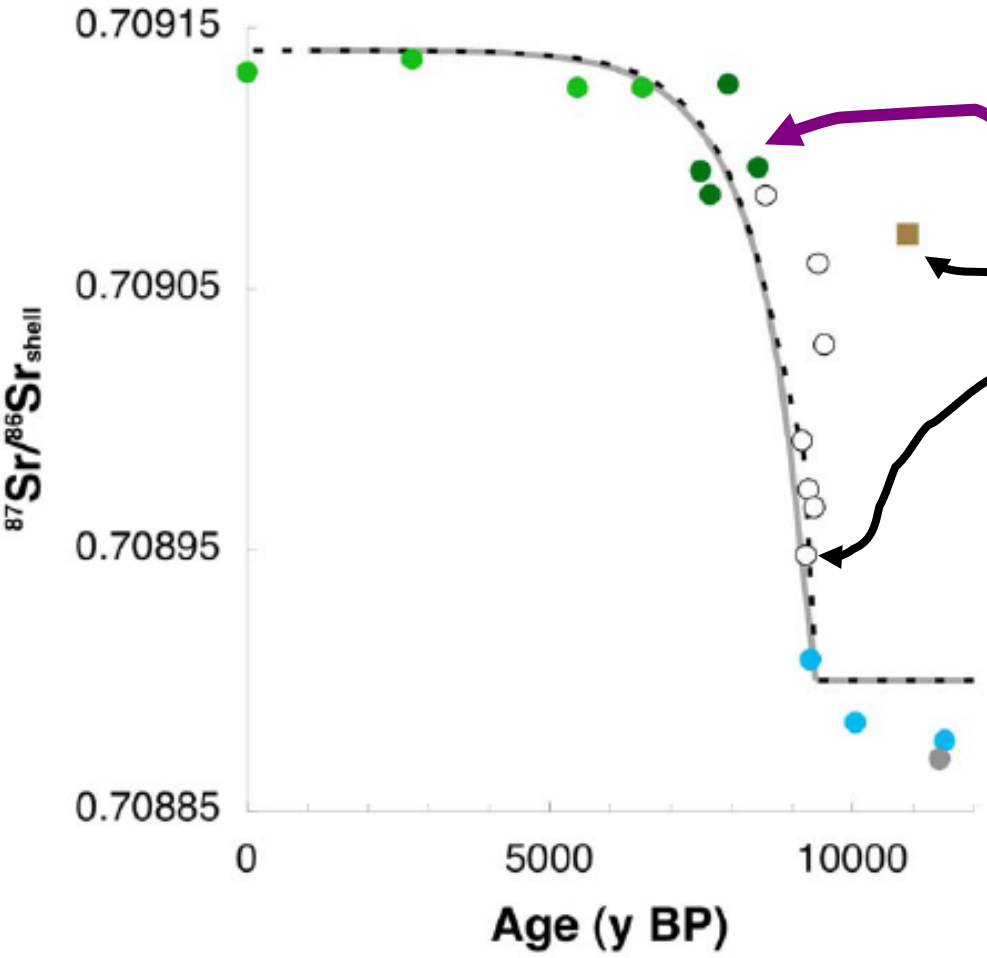


Figure 6: Sample age vs core depth.

- Symbols correspond to lithologic unit and/or mollusk assemblage
- **green circle**: euryhaline (marine) fauna,
- *Dreissena*, brown square: euryhaline fauna in channel fill,
- white triangles : brackish fauna in shell hash, grey circles
- red star: peat deposit (Gorur et al., 1998)). (ca 9500 years – see fig 5)
- Thin dashed line is ice-equivalent sea-level (Fleming et al., 1998).
- The marine linkage at at 9.4 ka BP cal. indicates a sill depth of ~30 m.
- Grey bar indicates the depth range of well-preserved coastal bedforms, which lie well below the depth of contemporaneous glacio-eustatic sea level from 14 ka BP cal (Ryan et al., 2003).

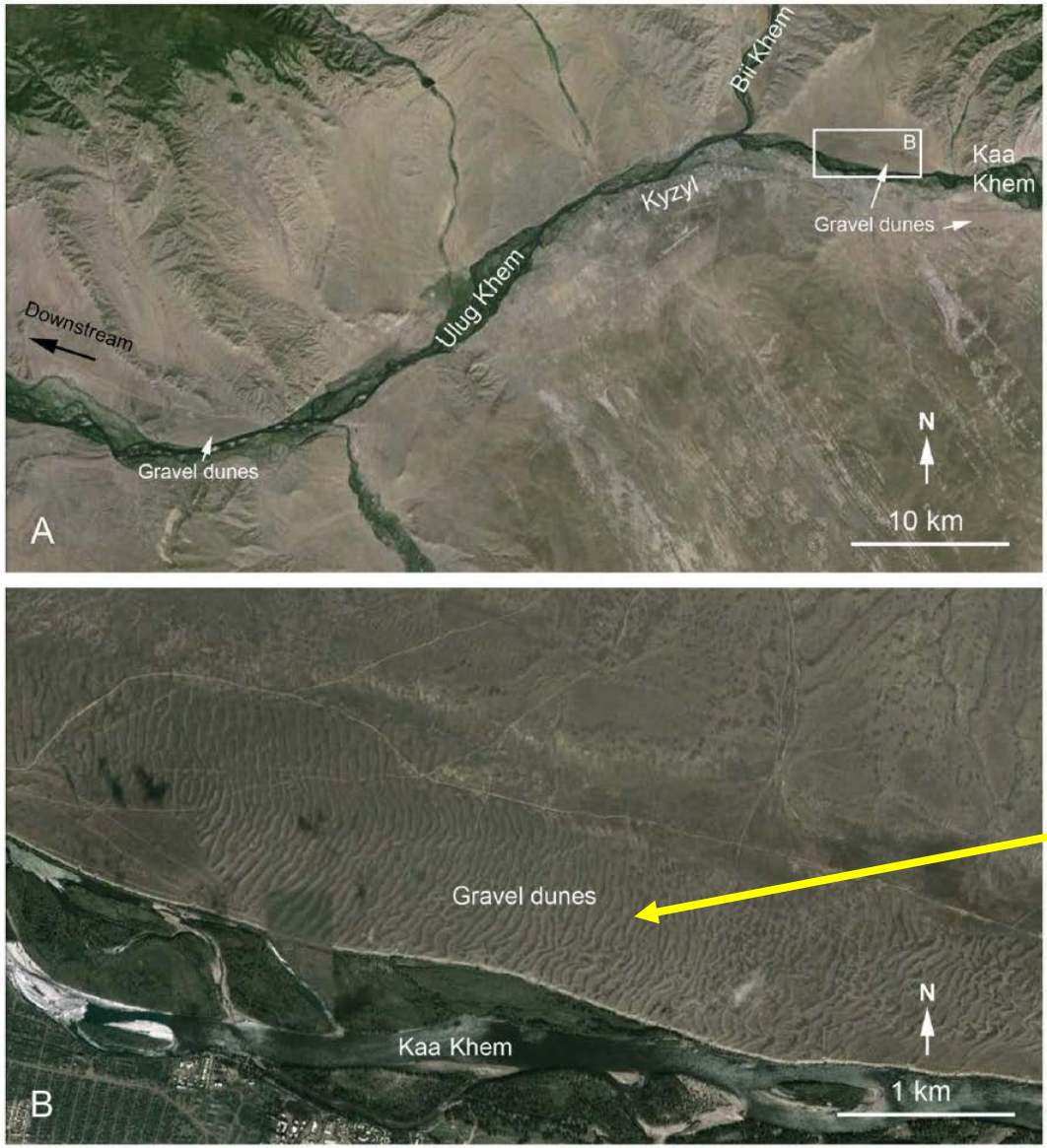
Black Sea / Черное море

Marine Ingress around 9500 yr BP , Морская Ingress около 9500 год BP

Hydraulic effects of water flow
Гидравлическое воздействие потока воды

Glacial Dam collapse Tuva Republic – Giant Ripple

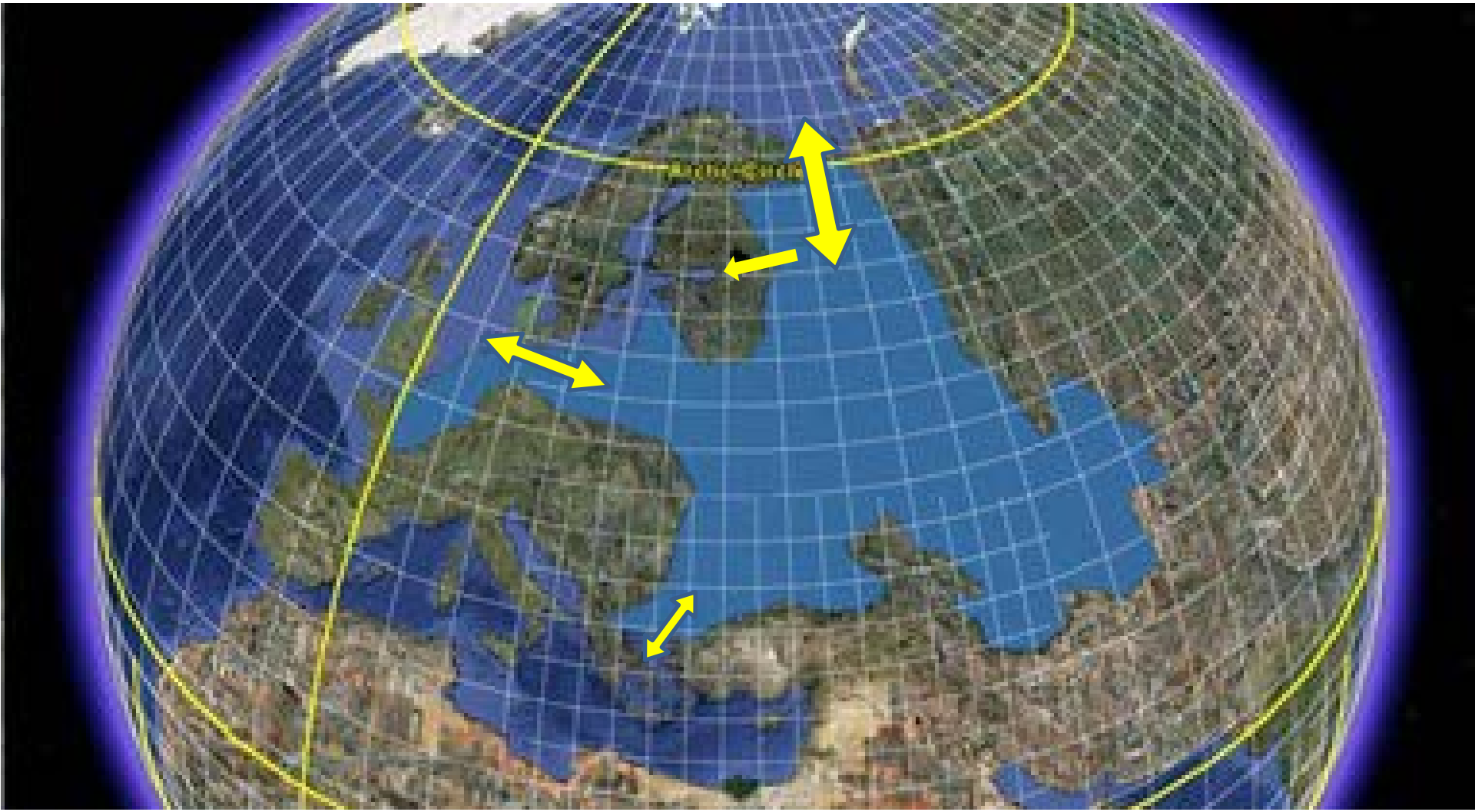
Ледниковая плотина обрушилась на Республику Тува - Гигантские рябь



Dunes
Дюны

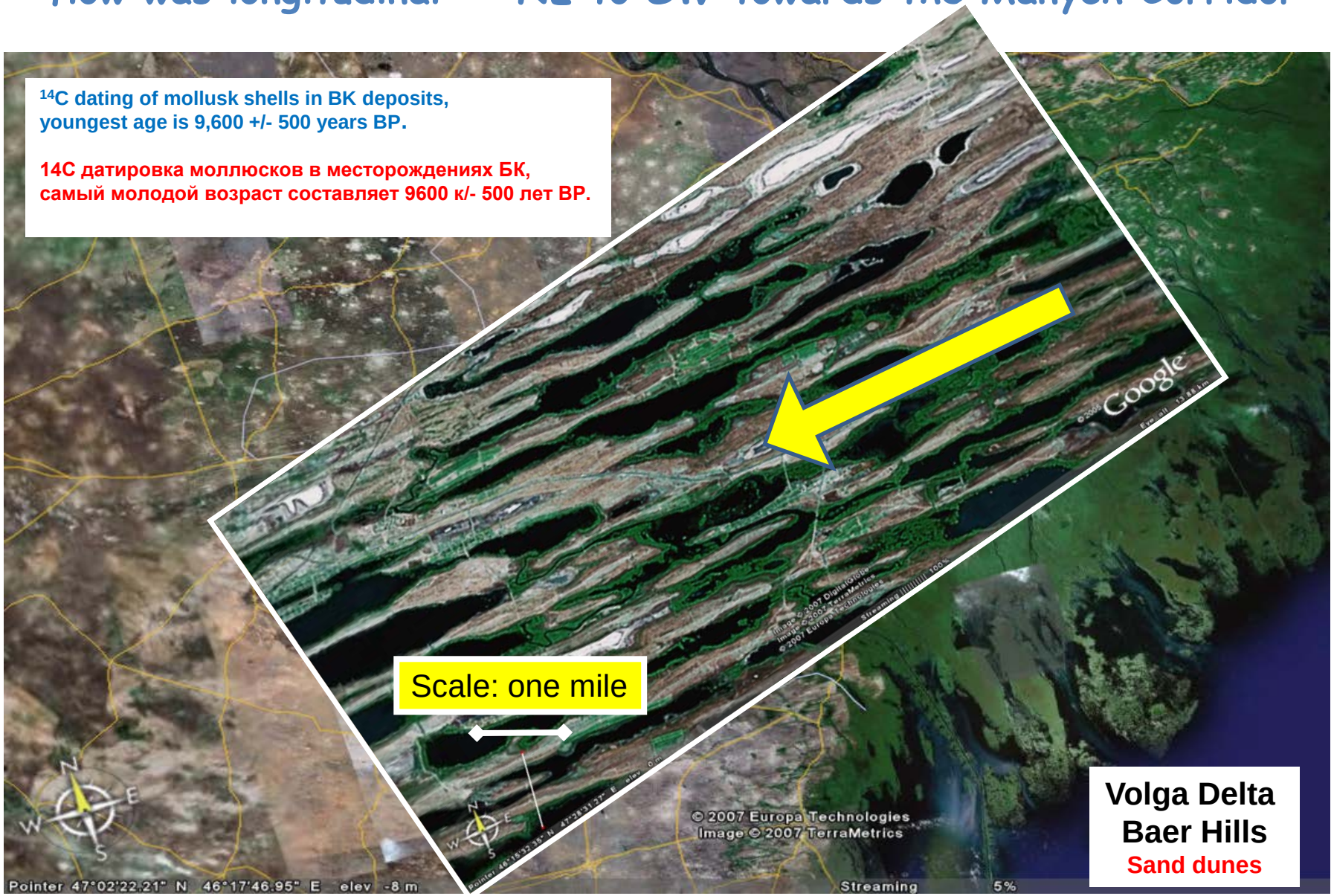
Figure 12. Locations of Sayan catastrophic flood gravel dunes near Kyzyl, the capital of the Tuva Republic (A), and a close-up of one of the gravel dune fields (B).

Flood Routes into and out of Eurasia
Маршруты наводнений в Евразию и из нее



Creation of the Baer Knolls

Dr. Badyukova proved they are Fluvial but believes the flow was longitudinal - NE to SW towards the Manych Corridor



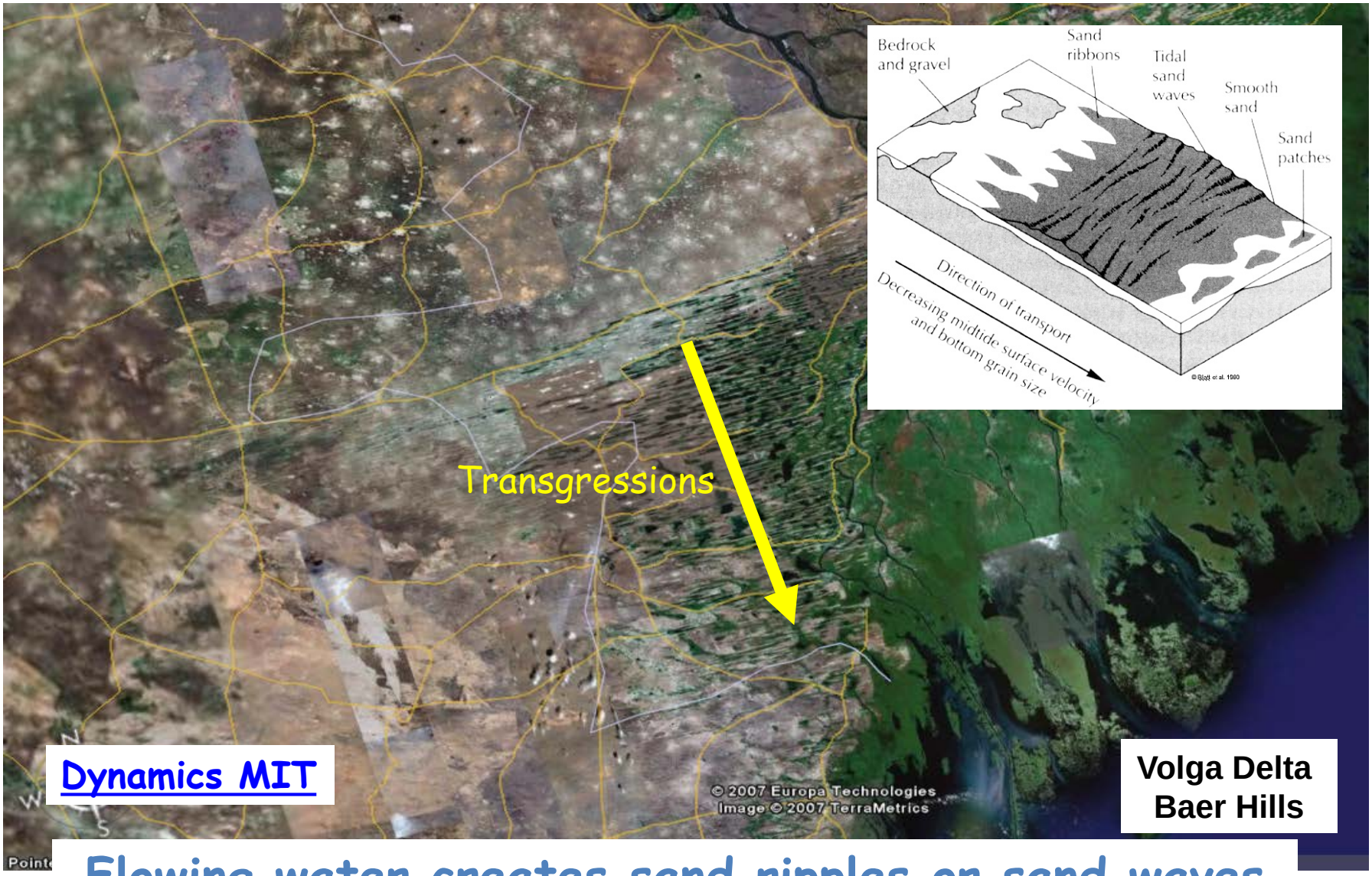
Alternating layers of silt, silty clay and sand

Eroded knoll in the Volga Delta (Badyukova)

A giant sand wave/ripple?

Sand Ripple/Wave Dynamics indicate North to South Flow

Динамика песчаной ripple/Wave указывает на север к южному потоку



Flowing water creates sand ripples or sand waves

Плавающая вода создает рябь песка или песчаные волны

Sediment waves near Derbent. Riverine cause

Осадок волн возле Дербента. Риверина причина

V.Putans

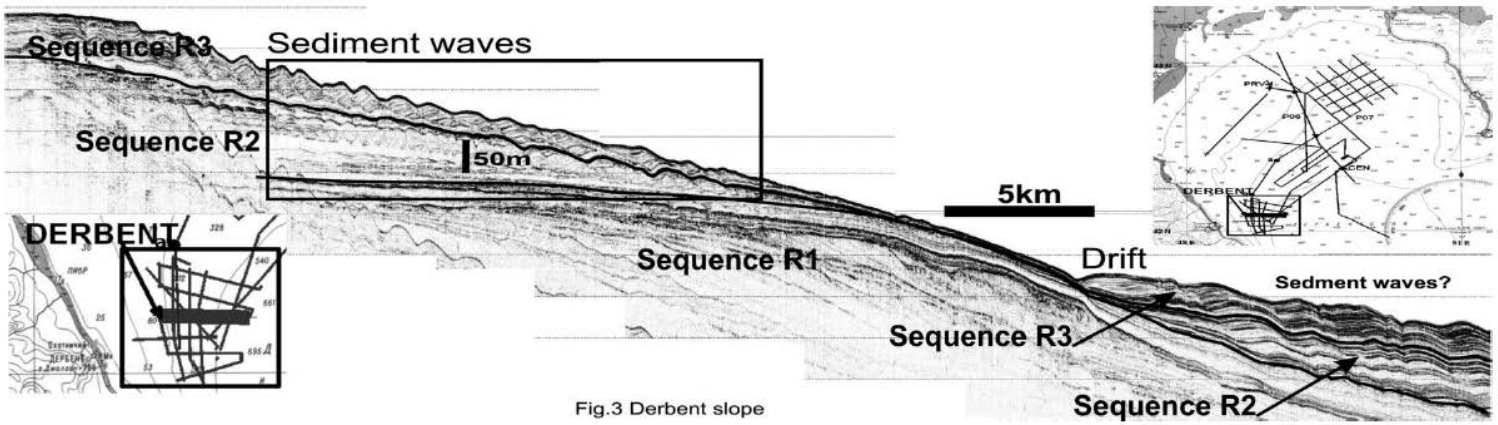
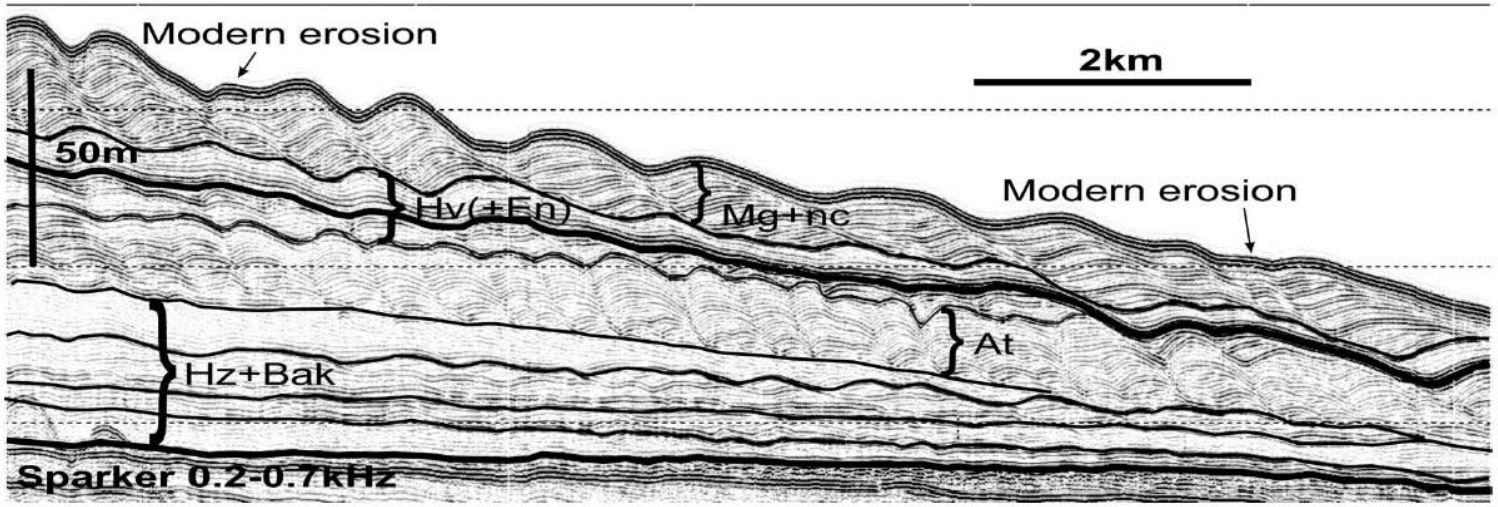


Fig.3 Derbent slope



Relic Sediment waves in Barents and Pechora seas

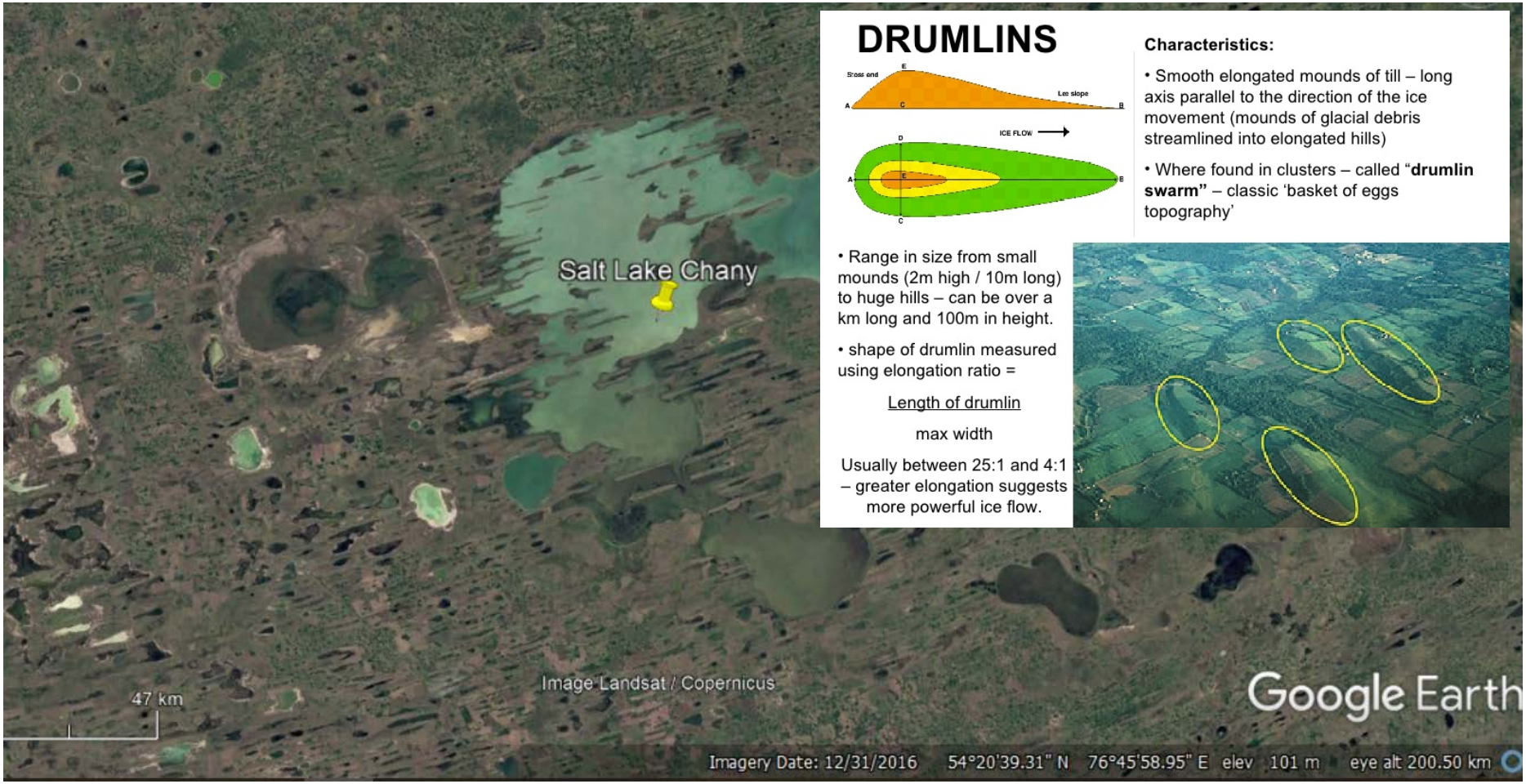
Волны реликтовых отложений в Баренцевом и Печорском морях (Nikiforov)

Salt Lake Chany with Drumlin Field ?

Солт-Лейк-Чани с Драмлин Филд?

Are drumlins not examples of sand waves and sea ingress ?

Являются ли барабаны не примеры песчаных волн и морского проникновения?



DRUMLINS

Characteristics:

- Smooth elongated mounds of till – long axis parallel to the direction of the ice movement (mounds of glacial debris streamlined into elongated hills)
- Where found in clusters – called "**drumlin swarm**" – classic 'basket of eggs topography'

- Range in size from small mounds (2m high / 10m long) to huge hills – can be over a km long and 100m in height.
- shape of drumlin measured using elongation ratio =

$$\frac{\text{Length of drumlin}}{\text{max width}}$$

Usually between 25:1 and 4:1 – greater elongation suggests more powerful ice flow.

Need to check ostracod history

Необходимо проверить историю остракодов

Novosibirsk whalebones

Новосибирские китовые кости

Sergey Krivonogov

Manych Spillway Valley compared to Glacial Lake Missoula floods

Долина Манхх-Спиплуэй по сравнению с ледниковым озером Миссула

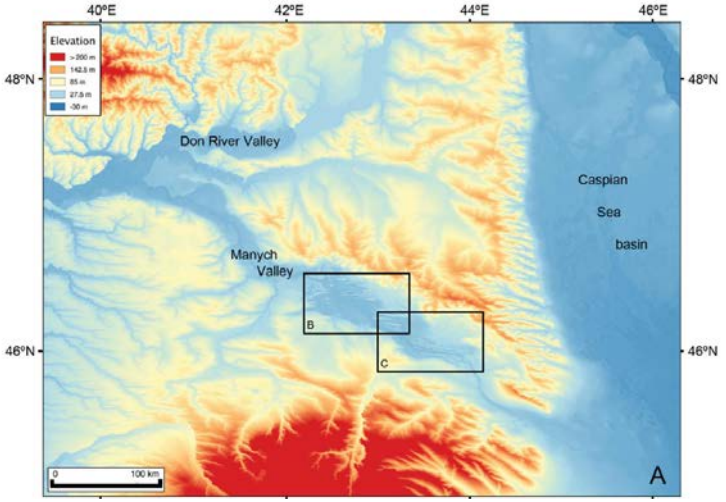
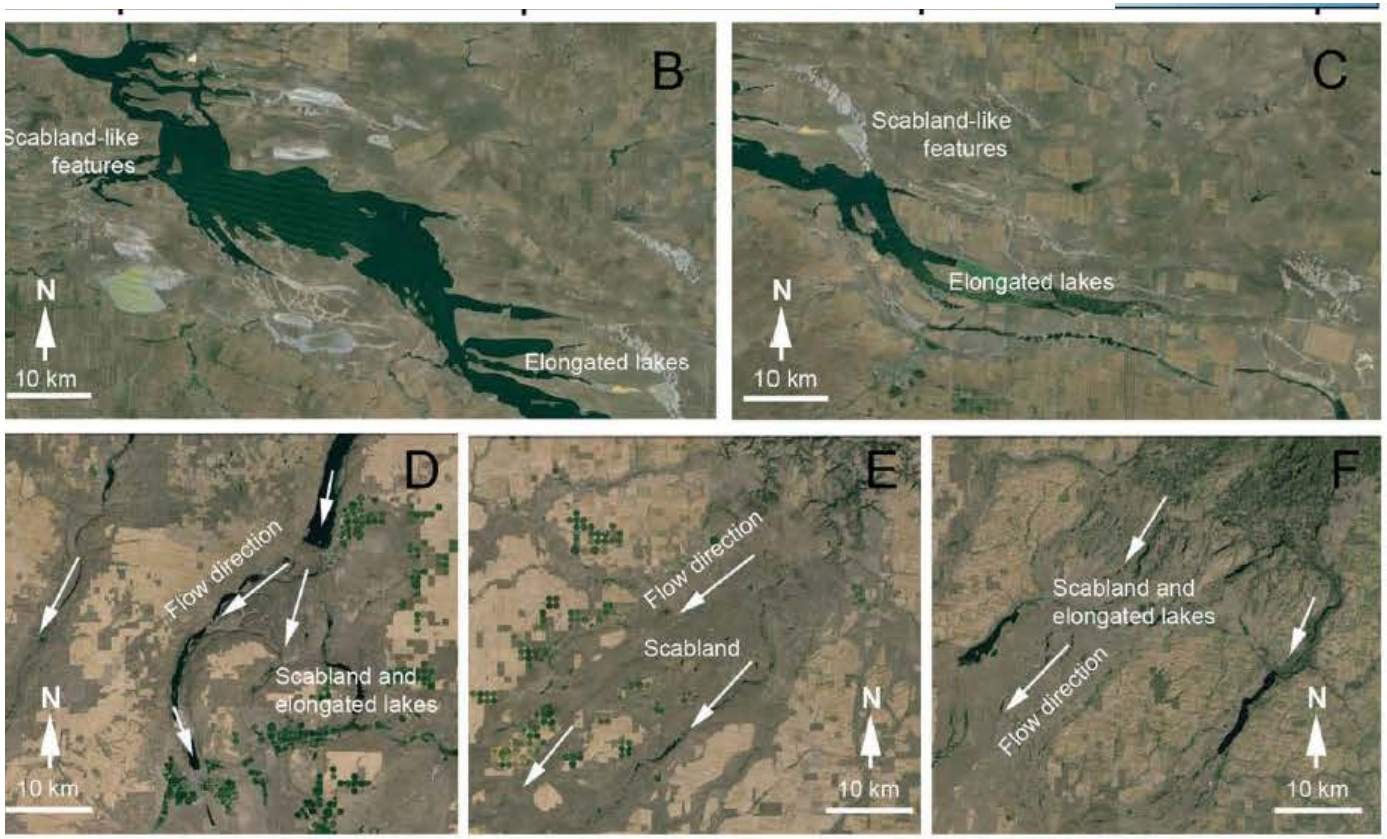


Figure 7. The geomorphology of the Manych spillway valley, comparable to the Pleistocene Glacial Lake Missoula floods in the northwestern USA, indicates that the spillover events may have been catastrophic. (A) SRTM topography of the area between the Caspian Sea and Sea of Azov, including the Manych Valley. (B, C) Satellite views of the Manych Valley; floors of the Manych Valley, which presently are elongated lakes and scabland-like features. (D, F) Example of catastrophic flood tracts in the Channeled Scabland, Washington State, USA.

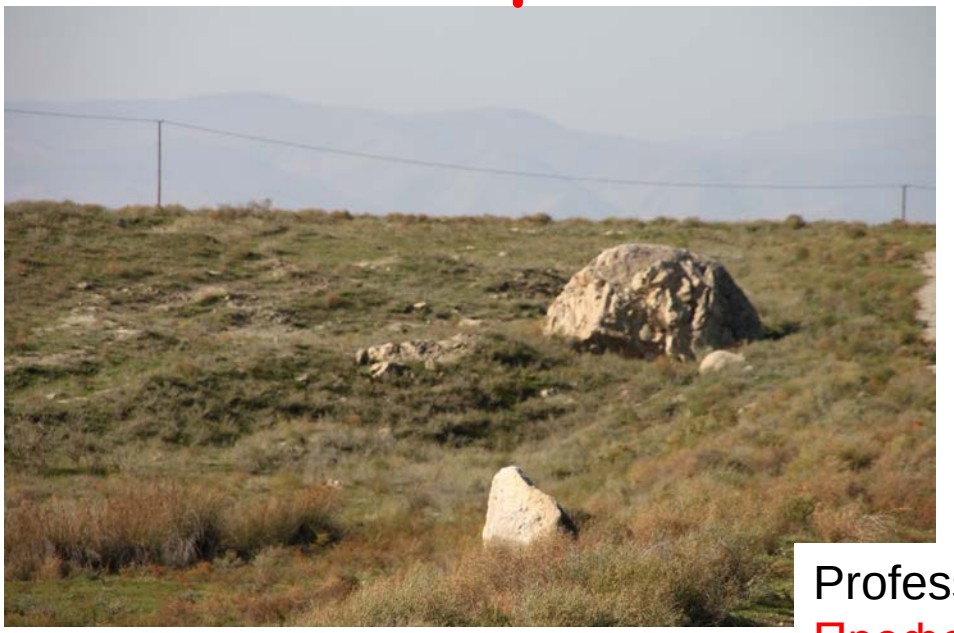


Elongated valleys and flow direction

Удлиненные долины и направление течения

Possible Fluvial erratics from mountains. Surabad

Возможные флювиальные неустойчивые с гор



Professor Goro Komatsu/Possible Tsunami

Профессор Горо Комацу/Возможное цунамиі

Needs to be checked

Estonia's rounded boulders - Закругленные валуны Эстонии

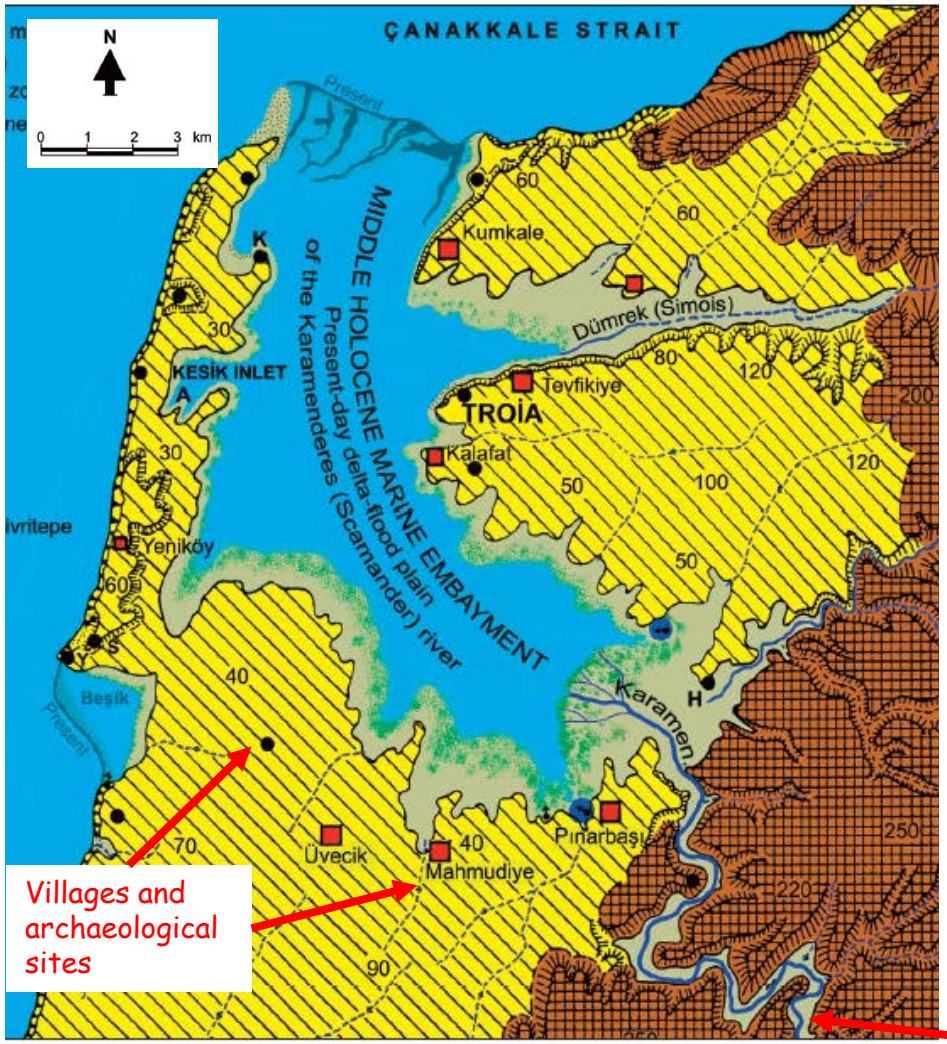
Could they be more fluvial? Могут ли они быть более fluvial?

Possible flood and emptying route
Возможный маршрут затопления и опорожнения

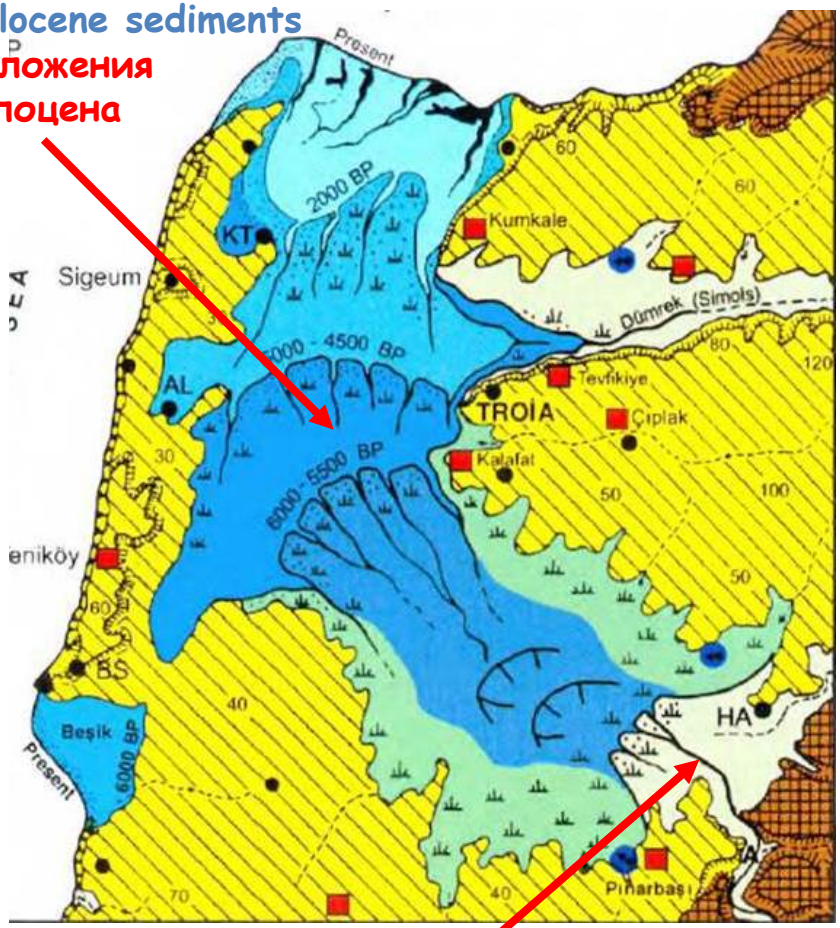
Location of some erratics (Internet search)
Расположение некоторых неустойчивых (поиск в Интернете)

Troy Bay and its delta flood plain puzzle
Трой Бэй и его дельта поймы головоломки

Professor
Ilhan Kayan



Villages and archaeological sites



Muddy Scamander/Karamenderes river

What happened to the previous interstadial sediments?
Что случилось с предыдущими межзвежными отложениями?

Canakkale Strait

outflow

Simois River

Karamenderes/Scamander River

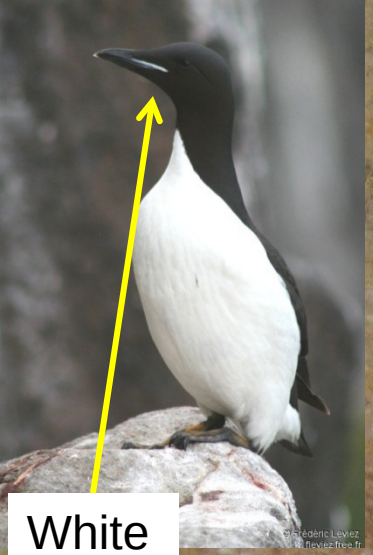
Were they washed away by the outflow from the Ponto Caspian region?

Были ли они смыты оттоком из Понто-Каспийского региона?

Imagery Date: 8/11/2016 39°58'33.42" N 26°16'05.84" E elev 36 m

Human Records of Flood and its consequences

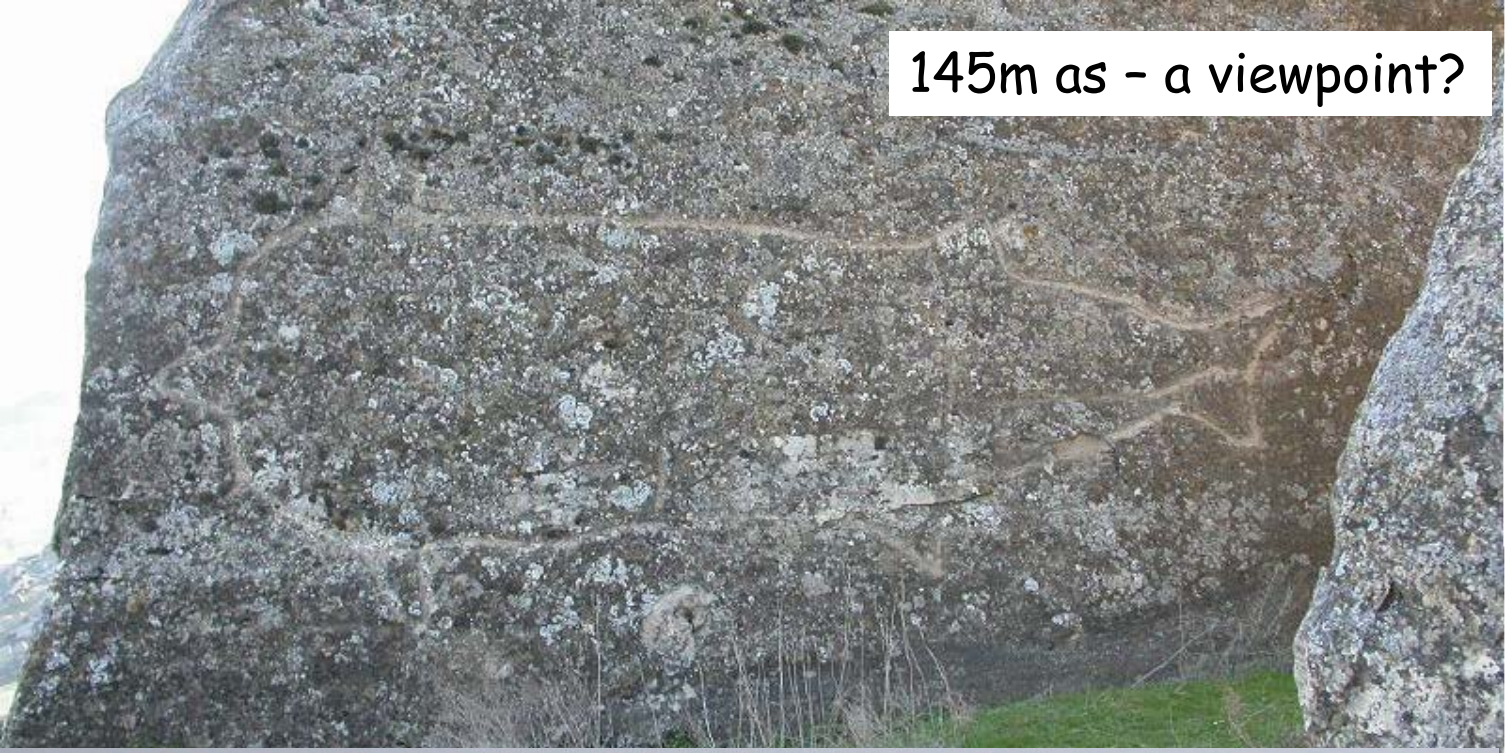
Человеческие рекорды потопа и его последствий

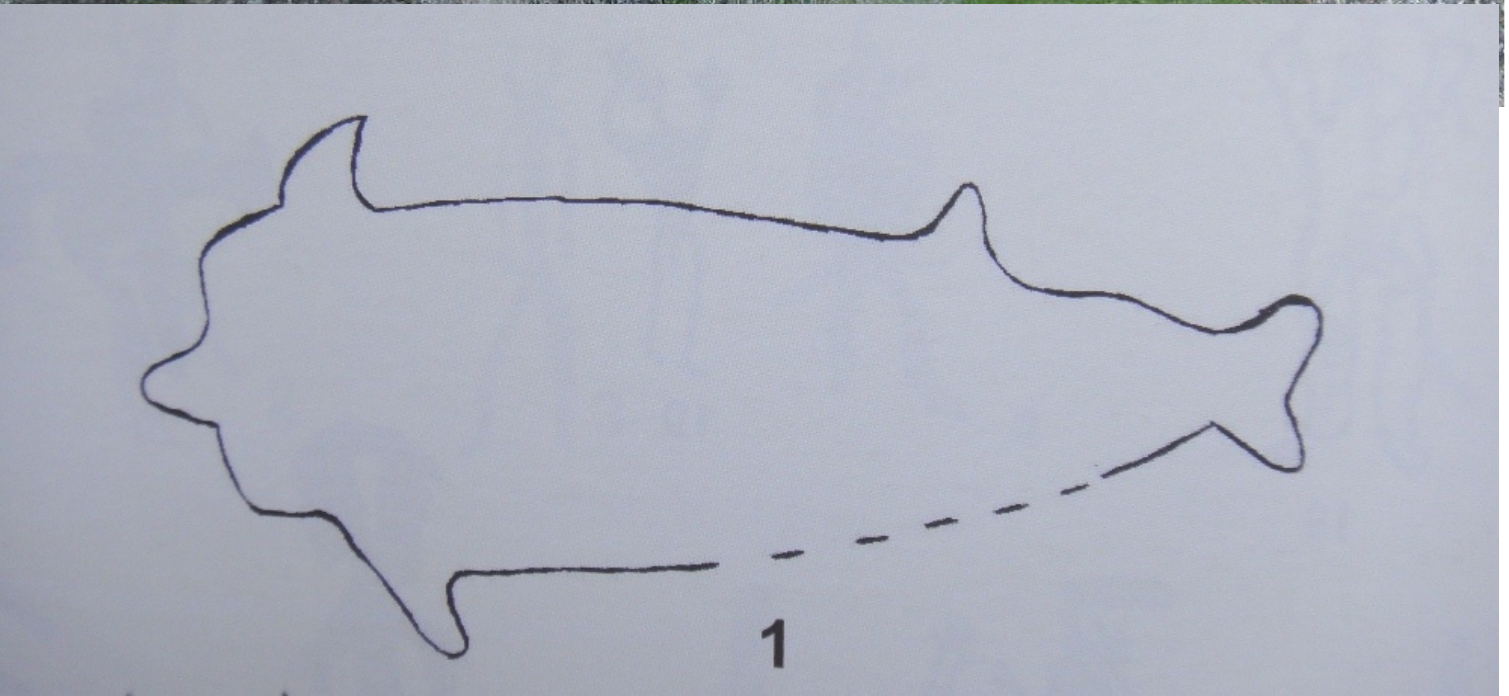


GOBUSTAN ROCK ART – Mysterious Animal?

Rock artist accurately portrays anatomy of a diving seabird

Possibly Brunniche's Guillemot – North Atlantic Arctic species





Gobustan

4 m fish ?

Unlikely shape

Possible Beaked Whale Petroglyph

If so then it indicates whales were present in Caspian Sea.

Bangudae Petroglyphs in South Korea
5000 year old images of
Whales and Whaling

Lamerla –Indonesia
Sperm Whale

Similarities exist to Whaling Rock Art in Sth. Korea 7.5ky BP. Provides eye witness evidence of whales.

Boat / toothed jawbone

Boat Fleet

Smoothed rock (dressed) in shape of whale

Comb like carvings –Baleen?

Head

Eye ?

Needs to be Studied

Two holes May represent tail flukes

Sun/Cockerel boat With trellises/hoist

Fish tail boat with plume at bow

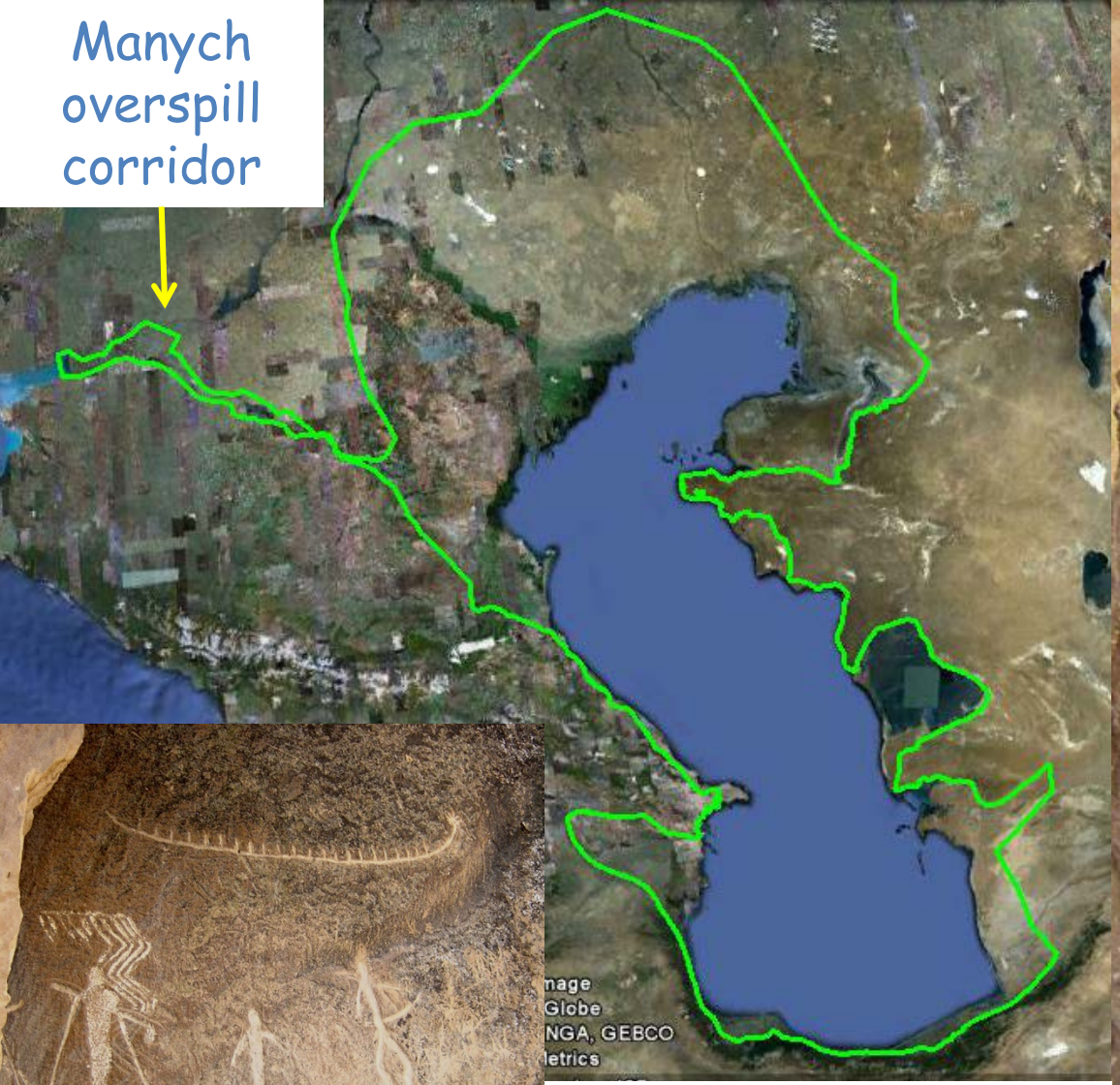
Trellises and hoist

Detailed rock art suggests that whales swam in the Caspian Sea and were hunted. This indicates that the Caspian Sea was connected to the Arctic Ocean at the end of the Ice Age

Whale behaviour - SKYHOPPING

Human Migrations
To safer territories

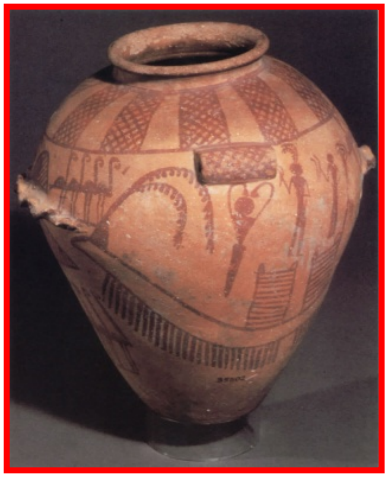
Manych overspill corridor

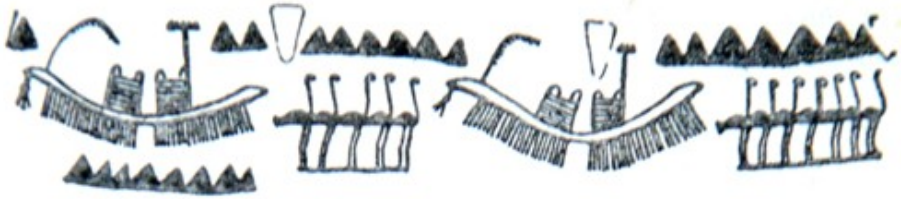


Stone Age Map of the Caspian Sea flowing through Manych corridor

Took goats in boats?

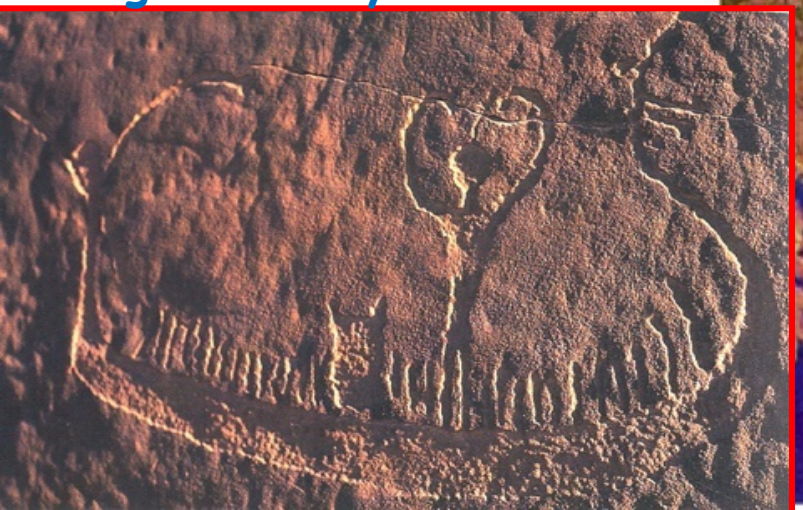
Egypt - Wadi Barramiya an Hammamat boats have similar design boats to those in Azerbaijan. Note twin plummed pennant.
They also contain images with upraised arm gesture that is typical of Azeri Rock Art.
Egyptian rock art is ca. 4.000 BCE.





Badarian Pottery Artwork

Images on pre-dynastic Badarian/Egyptian Pottery indicate a journey along a linear range of mountains. This suggests navigation along the Manych corridor.



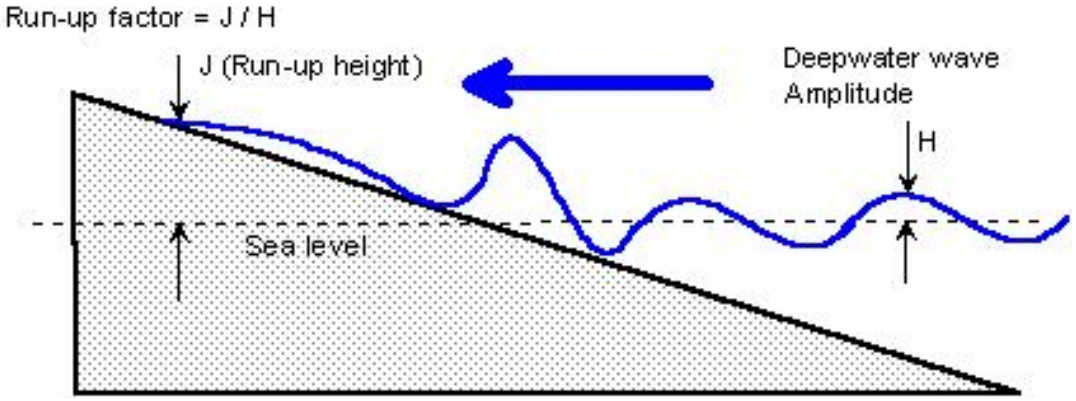
What caused the flooding?
Maybe a mega tsunami.

Что стало причиной наводнения?
Может быть, мега цунами.

Tsunami Run-up.

The large amount of water that a tsunami pushes onto the shore above the regular sea level is called Run-up, that is the maximum vertical height onshore above sea level reached by a tsunami. Run-up is the more damaging force than the huge tsunami waves as it surges inland and destroys all in it's path.

Local topography and directional travel have a great influence on the run-up effect of earthquake generated tsunamis. In Japan the run-up factor was 10 but can be as much as 25. Run-up factors of 40 have been observed in Hawaii.



Gilazi Valley Upper Strandlines
Долина Гилази Верхние Стрэндлайны

Double strandline within small valley branching off from the Gilazi Valley. Elevation approx. 339 m agsl. Location - 40°54'2.55"N 49° 8'23.09"E.

Gilazi Valley Upper Strandlines
Долина Гилази Верхние Стрэндлайны

Gilazi Valley Strandlines showing an upper height of 346m agsl. The strandline is sloping upward in this section from around 318m agsl over a distance of around 1350m.

Could this indicate the runup of a mega tsunami?

Может ли это указывать на преддверие мега цунами?

What caused the tsunami ?

Что вызвало цунами?

And possibly an increase in the Earths Polar Wobble (Chandler Wobble)

И, возможно, увеличение Земли Полярные Wobble (Чендлер Wobble)

Fig. 3 Comet from South Africa (Coimbra F.)

Younger Dryas impact hypothesis

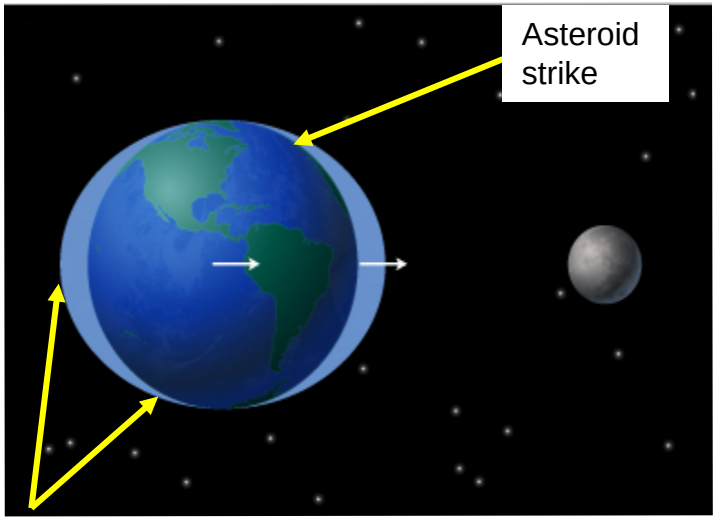
The **Younger Dryas impact hypothesis** or **Clovis comet hypothesis** posits that fragments of a large (more than 4 kilometers in diameter), disintegrating asteroid or comet struck North America, South America, **Europe, and western Asia about 12,800 years ago**

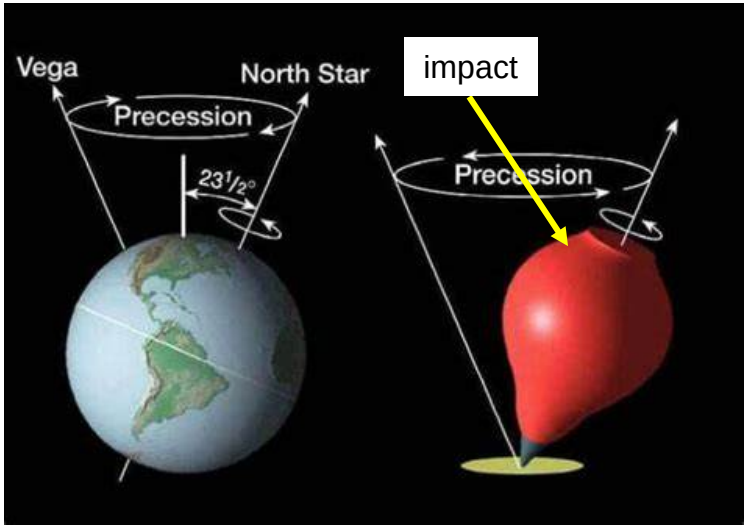
https://en.wikipedia.org/wiki/Younger_Dryas_impact_hypothesis

Could another impact happen 10000 years ago in the Arctic Ocean?
Может ли еще один удар произойти 10000 лет назад в Северном Ледовитом океане?

Note that relative to the centre of the earth, water level is higher at the equator than the North and South Poles

Обратите внимание, что по отношению к центру земли уровень воды выше на экваторе, чем северный и южный полюса





Spinning Top experiment

Possible Theory

1. Asteroid impacts Arctic Ocean causing a mega tsunami flooding onshore. Impact alone may affect the Chandler wobble

2. Mass of water thrown on land impacts rotational balance and increases wobble and shifts equatorial bulge north and south by a few degrees. High latitudes already have high tides. (Mezen Bay 14m, Bay of Fundy 20m) (Isostatic depression by Ice caps)

Возможная теория

1. Астероид ударяет По Северному Ледовитому океану вызывая мега цунами наводнения на суше. Воздействие само по себе может повлиять на колебания Чендлера

2. Масса воды, брошенной на землю, влияет на вращательный баланс и увеличивает колебания и сдвиги экваториальной выпуклости на север и юг на несколько градусов. Высокие широты уже имеют приливы и отливы. (Мезен-Бей 14м, залив Фанди 20м

Summary

- Azerbaijan's strandlines record flood levels.
- One huge marine flood ca 10ky BP. Many physical, chemical, biological and human consequences.
- Fresh water Ice Age continental flooding. Many consequences; loess, Human demographics.
- Scientific data should be reviewed through the lens of a marine flooding event.
- Discussion and research needed.
- If proven asteroid impact has safety implications to mankind.

- На нити азербайджана рекордные уровни наводнений.
- Один огромный морской паводок ca 10ky BP. Много физических, химических, биологических и человеческих последствий.
- Свежая вода Ледниковый период континентального наводнения. Много последствий; лэсс, демография человека.
- Научные данные должны быть рассмотрены через призму морского наводнения.
- Необходимы дискуссии и исследования.
- Если доказано воздействие астероида имеет последствия для безопасности человечества.

Sherlock Holmes
Шерлок Холмс

'When you have eliminated the impossible, whatever remains, however improbable, must be the truth?'

"Когда вы устранили невозможное, все, что остается, каким бы невероятным, должно быть правдой?

Jean-Baptiste Lamarck

It is not enough to discover and prove a useful truth previously unknown, but that it is necessary also to be able to propagate it and get it recognized.

AZ QUOTES

Недостаточно обнаружить и доказать, что полезная истина ранее неизвестна, но необходимо также уметь распространять ее и распознавать ее.

Your thoughts are welcome. Ваши мысли приветствуются

'Strandlines are very real and require an explanation'

'Strandlines очень реальны и требуют объяснений'

Спасибо за ваше внимание

Supplementary slides

Mediterranean Mussel
Mytilus galloprovincialis

Invaded Black Sea from Mediterranean

Examples

Blue Mussel
Mytilus edulis

Present in **Black Sea** 6000 years ago at a depth of 100m. Temperate water species **NOT** native to Mediterranean and Black Sea?

However with influx of cooler water from Arctic Ocean / Barents Sea allowed mussel to temporarily flourish suggesting it:

Was not misidentified?

RISK LIST

esa
European Space Agency

Object Name	Diameter [m]	Date/Time	IP max	PS max	TS	Years	IP cum	PS cum	Vel. [km/s]	In list since [days]
2010RF12	9*	2095-09-05 23:50	1/16	-3.26	0	2095-2117	1/16	-3.26	12.29	3205
1979XB	700*	2113-12-14 18:07	1/1.84E6	-3.28	0	2056-2113	1/1.15E6	-2.96	26.04	14316
2019DS1	26*	2082-02-26 19:15	1/787	-3.35	0	2082-2108	1/767	-3.34	15.32	163
2000SG344	30*	2071-09-16 00:26	1/2096	-3.63	0	2062-2116	1/326	-2.88	11.26	6718
99942 Apophis	375	2068-04-12 15:13	1/531914	-3.67	0	2068-2116	1/434655	-3.59	12.62	5005
2009JF1	13*	2022-05-06 08:12	1/4464	-3.75	0	2022	1/4464	-3.75	26.41	3581
2008UB7	50*	2060-10-31 18:26	1/36101	-3.83	0	2044-2112	1/15203	-3.51	21.57	3785
2006JY26	8*	2074-05-03 01:00	1/86	-3.91	0	2073-2116	1/47	-3.65	11.57	4674
2008JL3	30*	2027-05-01 09:07	1/13280	-3.95	0	2024-2116	1/11551	-3.94	14.01	3945
2012QD8	90*	2047-03-08 23:18	1/188679	-3.95	0	2047-2112	1/184081	-3.94	23.58	2393

Astronomers at Russia's largest observatory said Friday an asteroid now orbiting the sun may strike the Earth in 2035, but that the odds of a catastrophic collision can be estimated only 22 years from now **20.10.2006**.

https://sputniknews.com/russia/2006102054992489/

Edible cockle (*Cardium edule*)

In Barents Sea

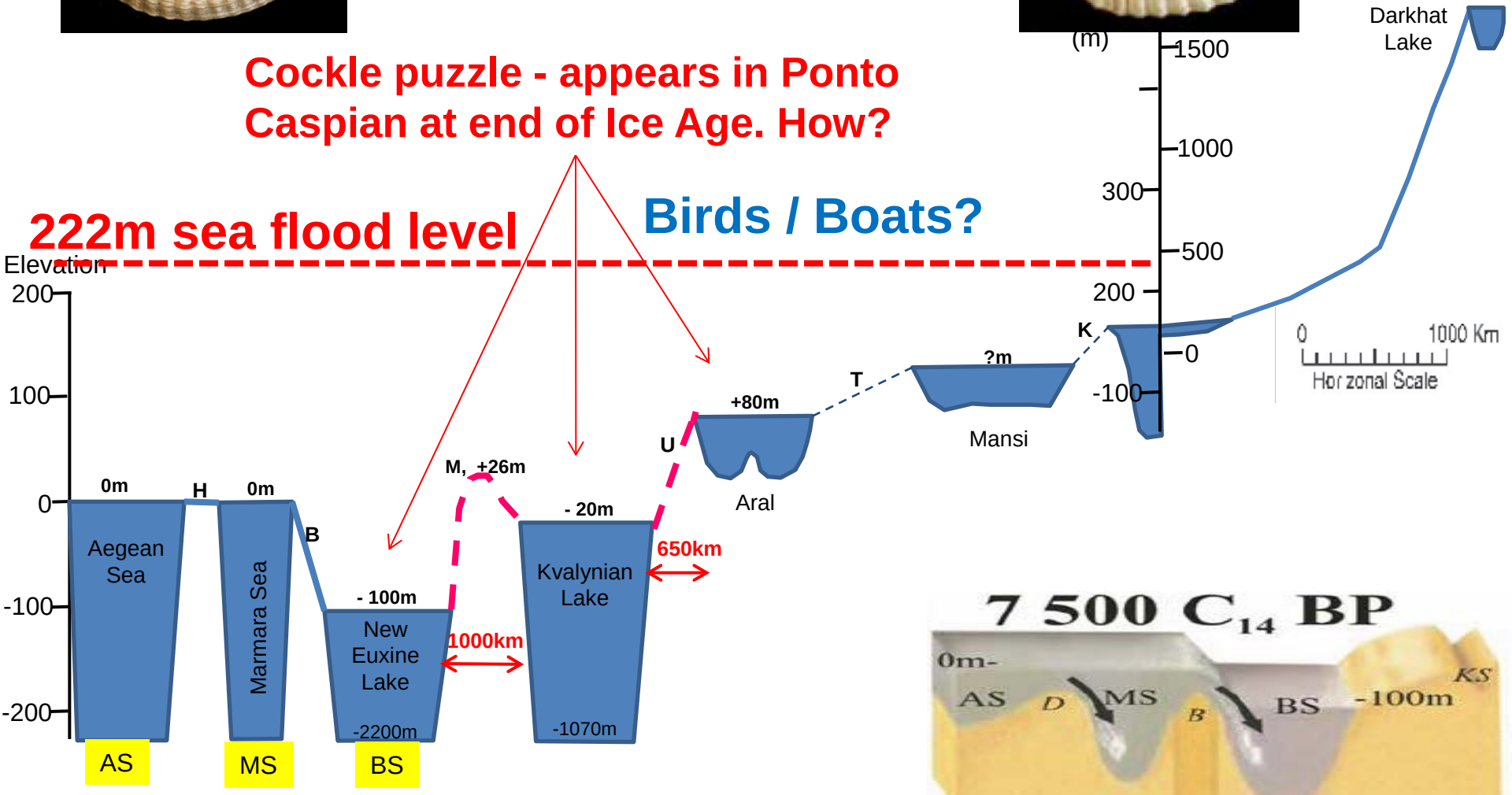
MISIDENTIFIED ??

Lagoon cockle *Cerastoderma glaucum*

Cockle puzzle - appears in Ponto Caspian at end of Ice Age. How?

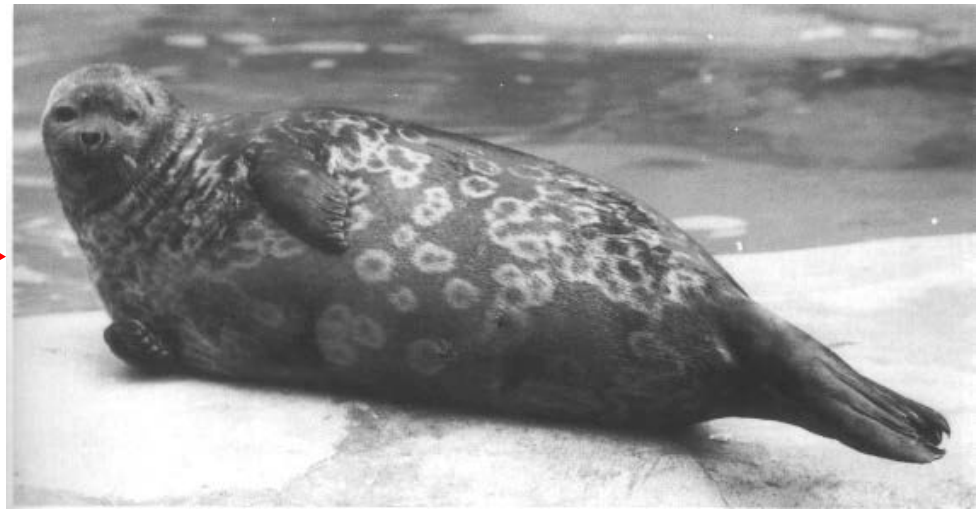
222m sea flood level

Birds / Boats?



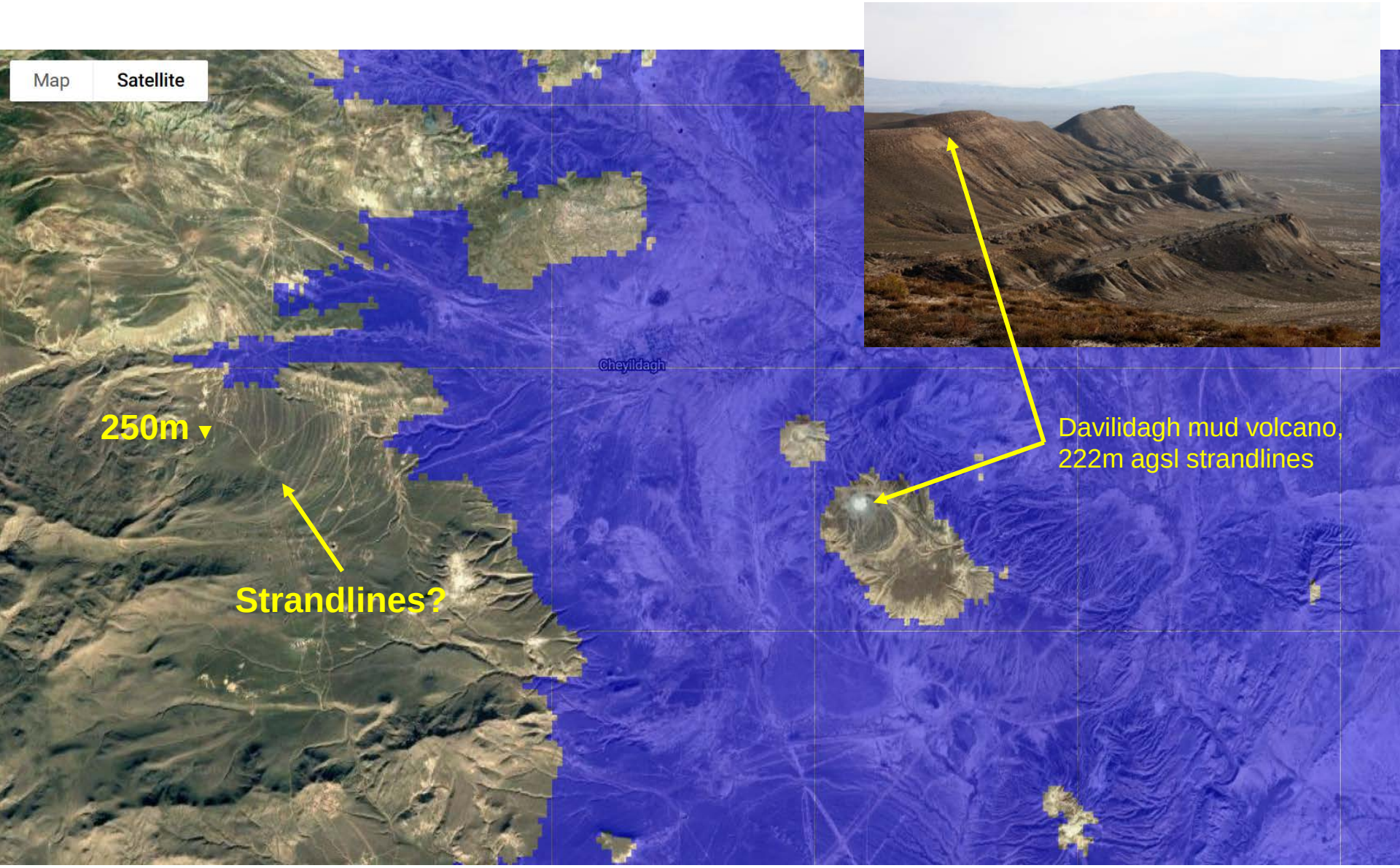
Previous Arctic Connections

Genetically separated by 700,000 years

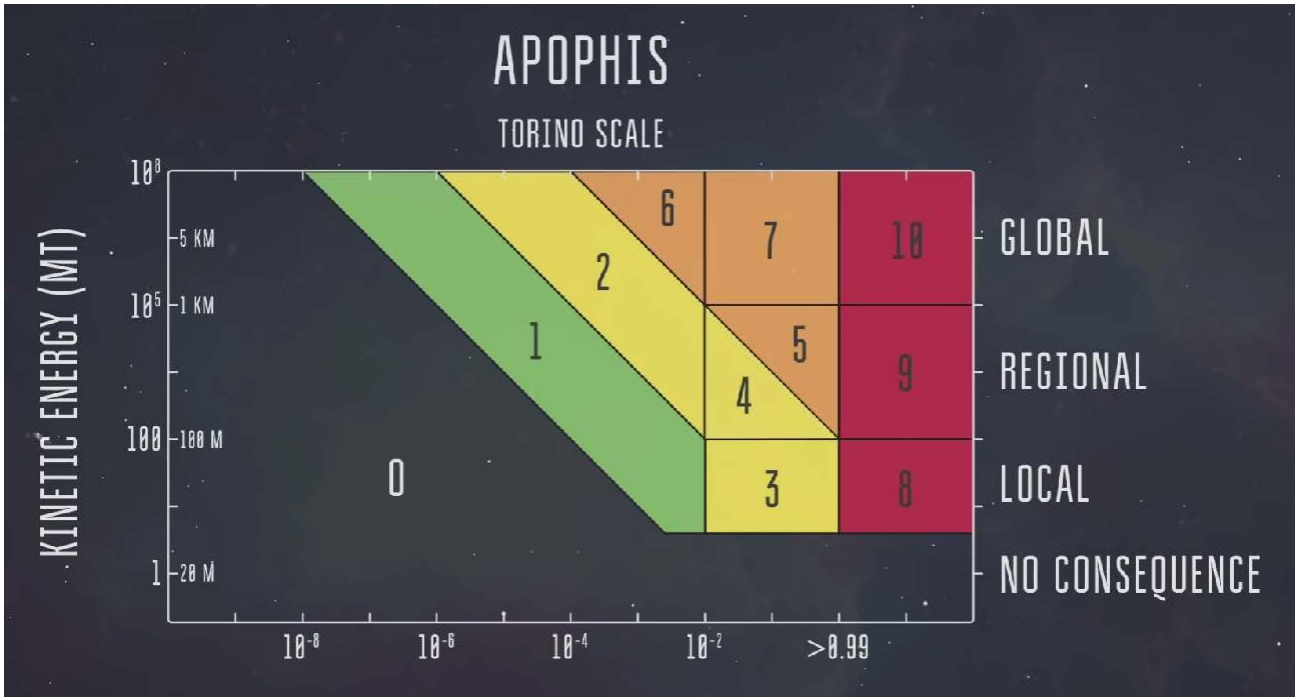


Arctic Ringed Seal
Pusa hispida

Caspian Seal
Pusa caspica



Montage of a 222 m temporary highstand flood in the Caspian showing how the mud volcano Davilidagh would appear. Note even higher strandlines to the West


APOPHIS
TORINO SCALE
KINETIC ENERGY (MT)
10^8
10^5
100
1
5 KM
1 KM
100 M
20 M
0
1
2
3
4
5
6
7
8
9
10
GLOBAL
REGIONAL
LOCAL
NO CONSEQUENCE
10^-8
10^-6
10^-4
10^-2
>0.99

Spillway Bottlenecks

Implications of freshwater flooding And large inland freshwater lake

- Loess Production
- Spring Meltwater Varves

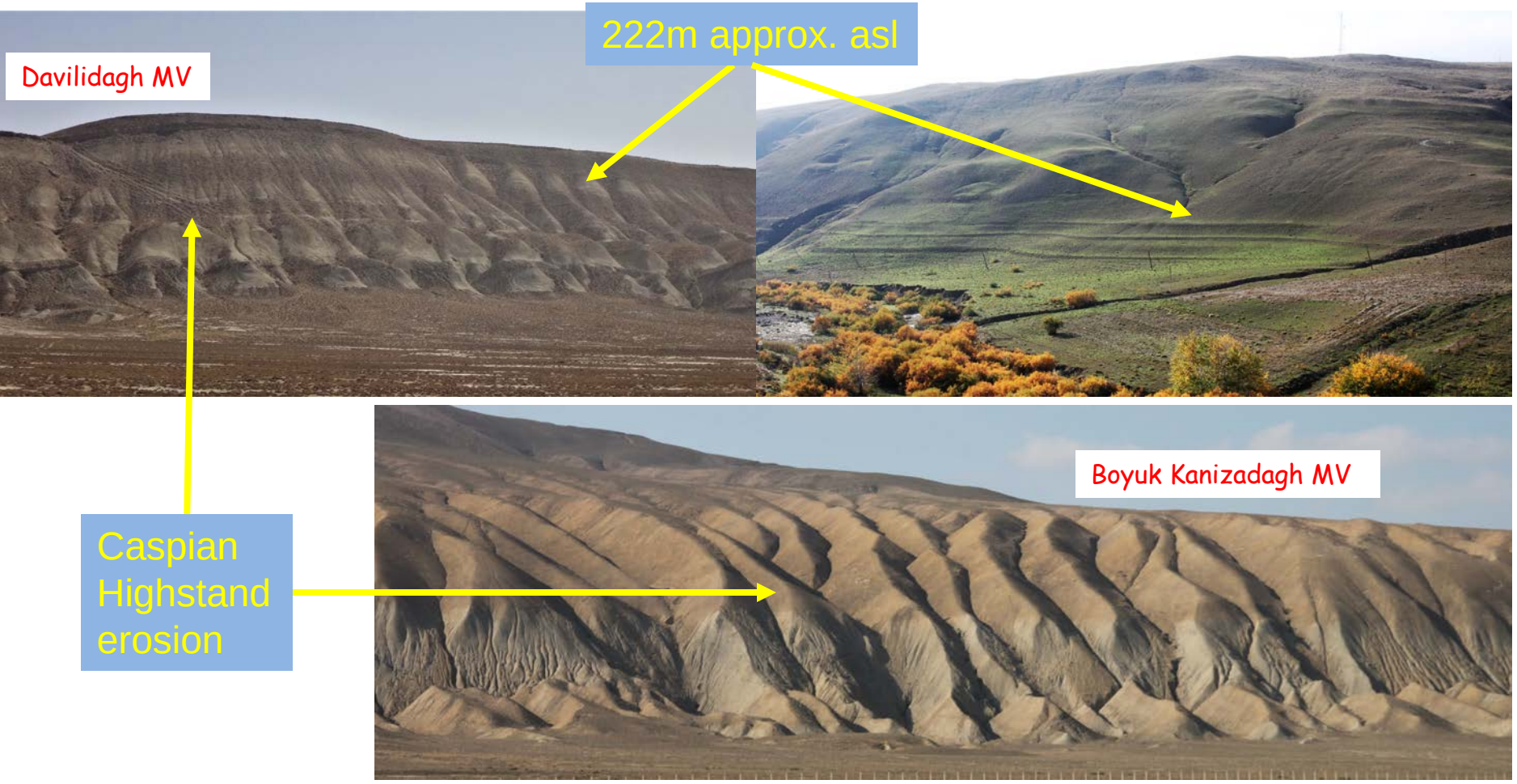
Answer – probably both

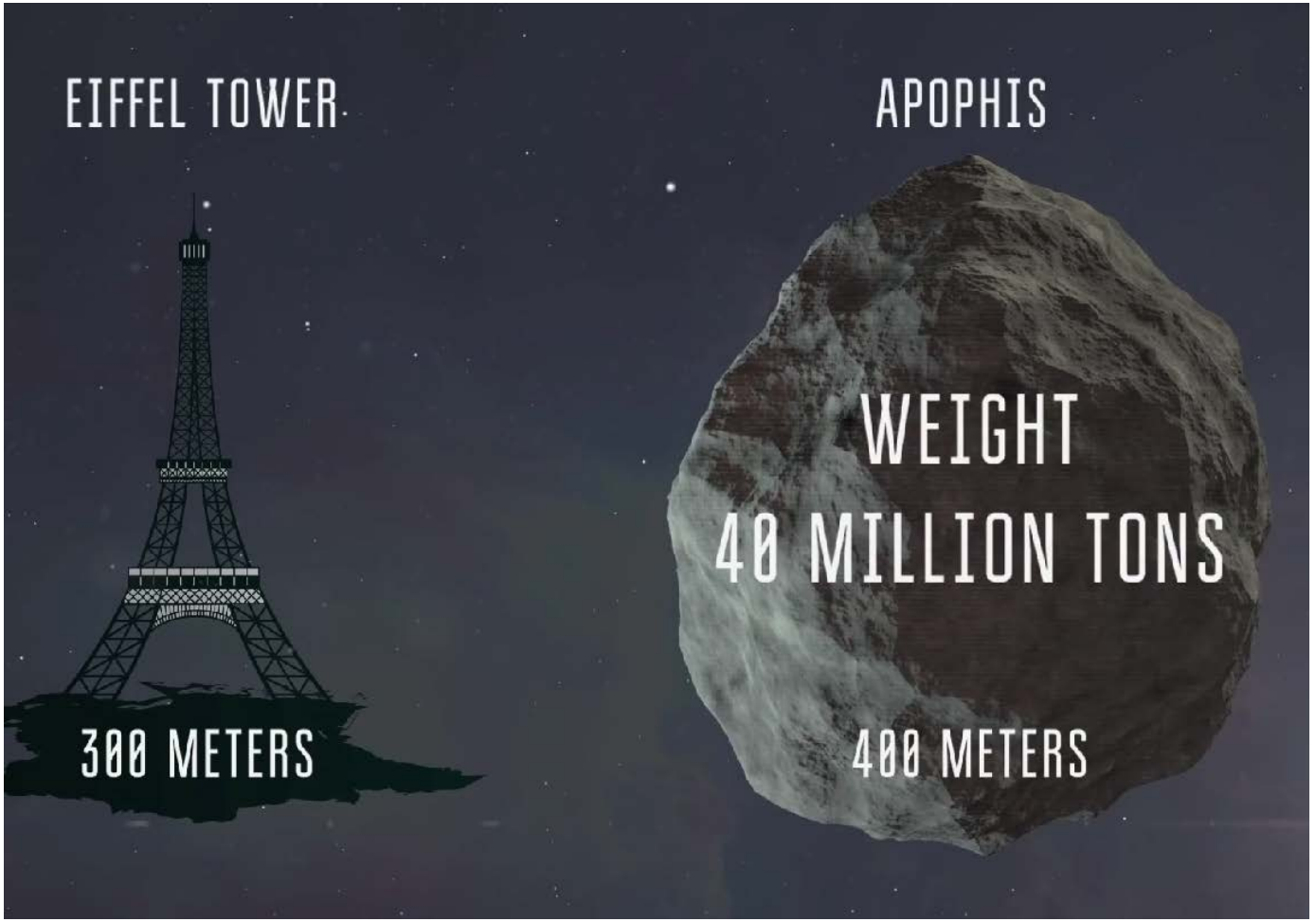
Primary Loess is formed under water - Alluvial,
Secondary Loess is Windblown or Aeolian

Question

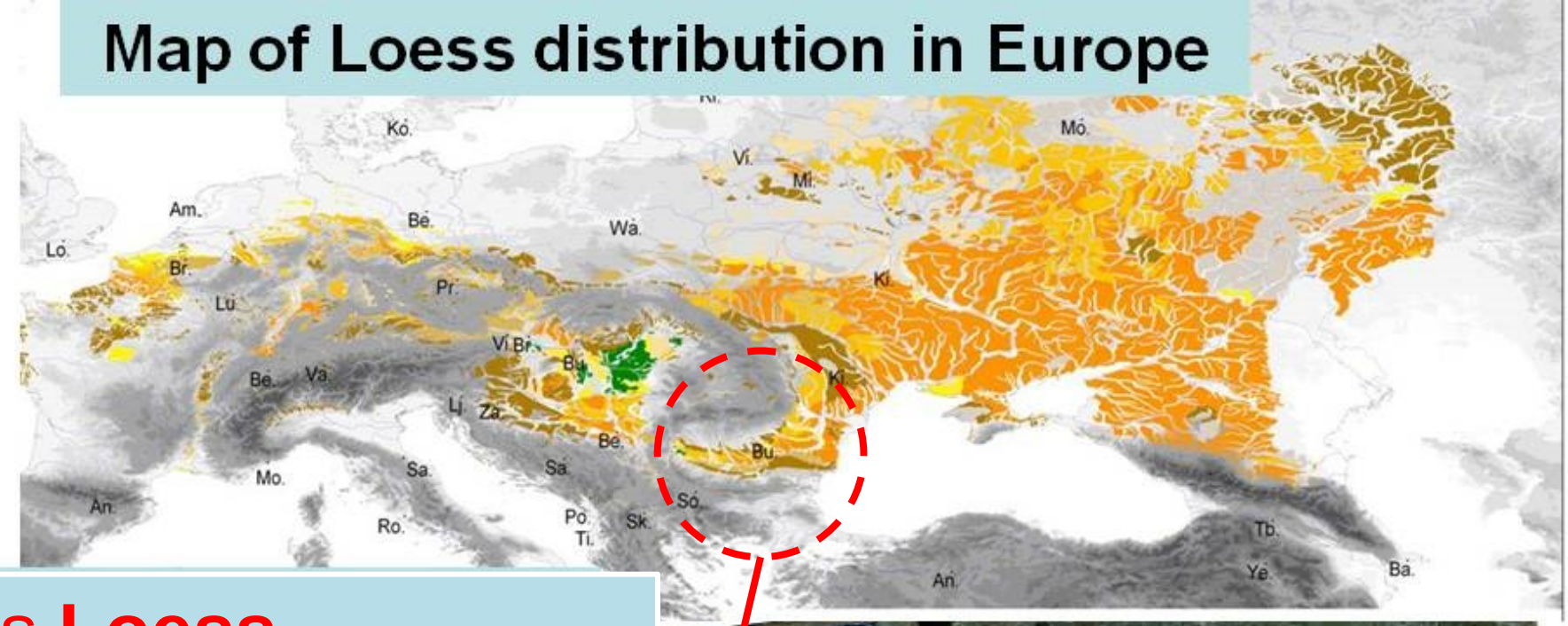
With two Strandlines around 222m asl and extensive wave erosion, is this due to a common flood event ?

Probably yes.




EIFFEL TOWER
300 METERS
APOPHIS
WEIGHT
40 MILLION TONS
400 METERS

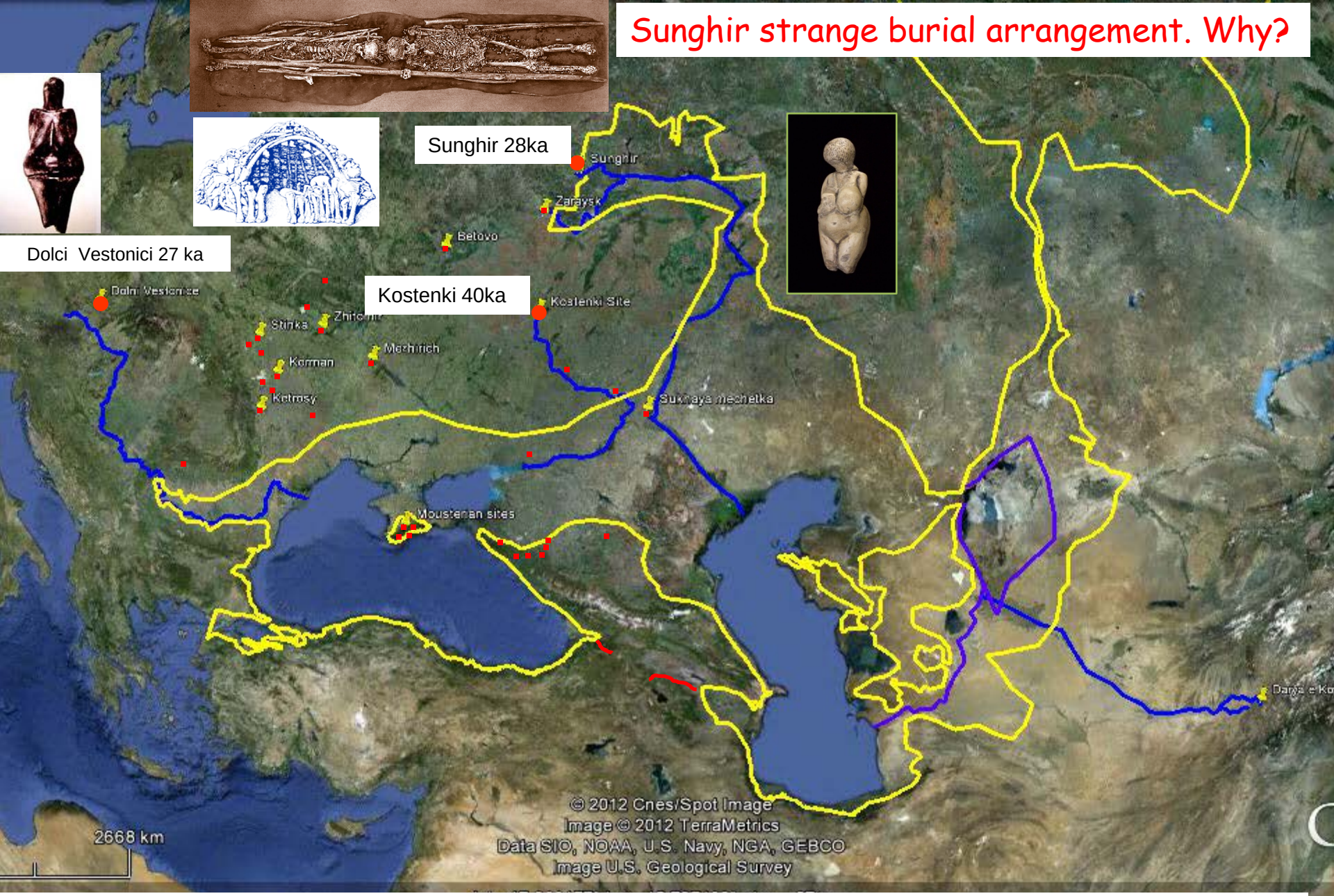
Map of Loess distribution in Europe



Is **Loess**
Alluvial or Aeolian?

Sediment layers at the entrance to the Qobu Valley at 0m agsl. Similar to varves, as seen in alpine lakes.

Possible Evidence of Glacial Meltwater? Can be dated,- OSL.



Proxy Evidence of Flood levels-Palaeolithic Settlements

All above mega lake and close to rivers.

Turgay Valley and Scablands - Тургайская долина и Скаблендс

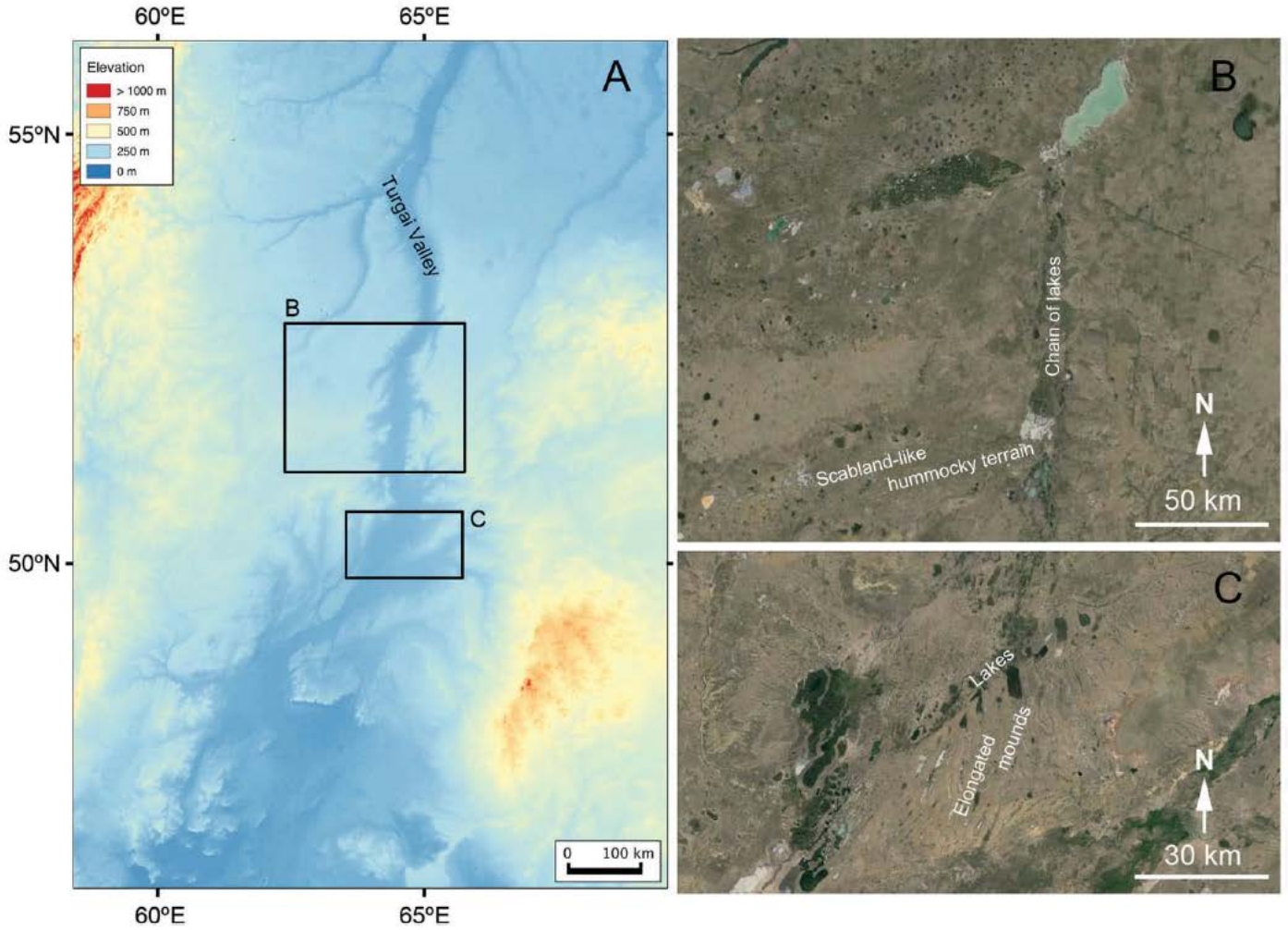


Figure 8. The Turgai spillway valley is considered to have hosted flow from the glacier-dammed Lake Mansi. The nature of flow may have been steady and continuous for most of the spillover period. However, some unusual landforms distributed along the valley may indicate catastrophic flow events. (A) SRTM topography of the area including the Turgai Valley. (B) Satellite view of the Turgai Valley; on the floor of the valley floor lies a chain of lakes; scabland-like hummocky terrain along the western margin of the Turgai Valley. (C) Satellite view of the Turgai Valley; besides lakes (topographic low), there are also parallel elongated mounds.

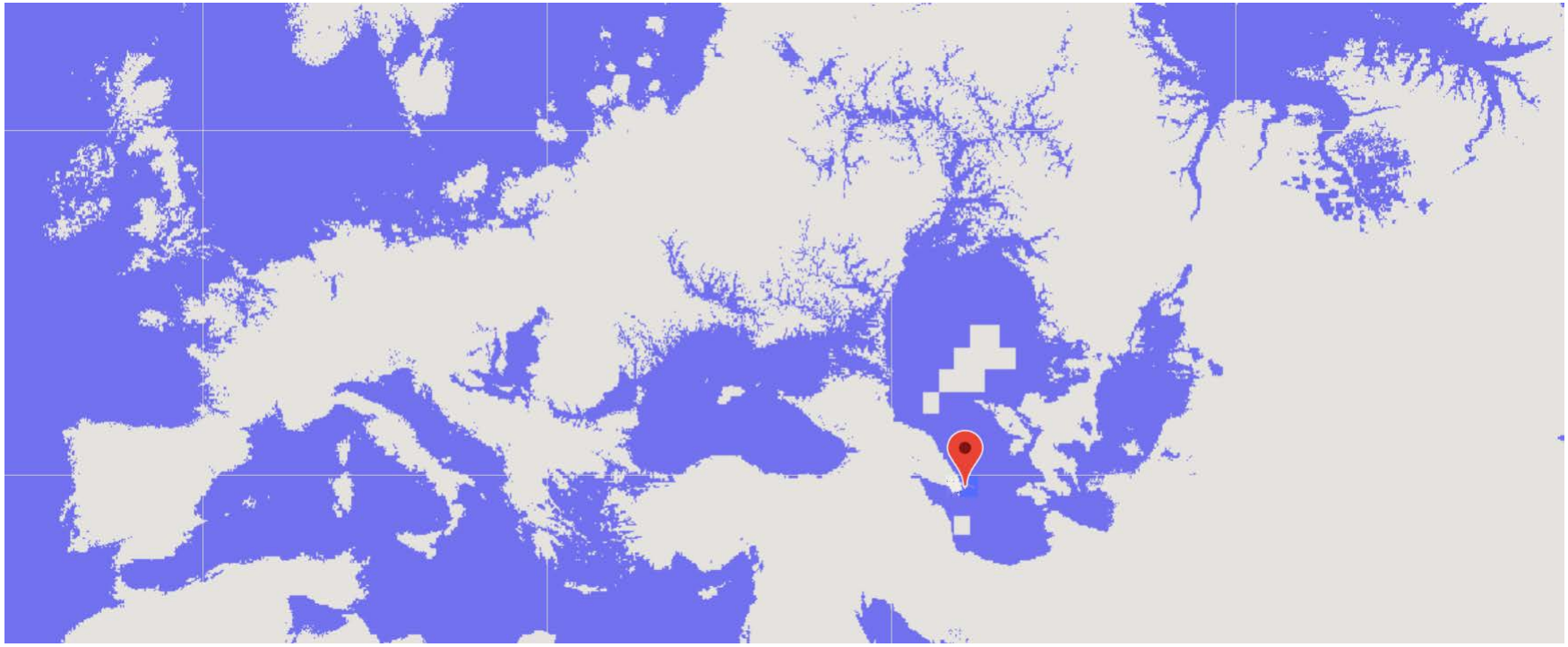
115 m asl

Boyuk Kanizadagh Mud Volcano – Puzzling 'strandline'

22 6 2002

Gilazi Valley Puzzle in Context

Sea Level set at 125m asl



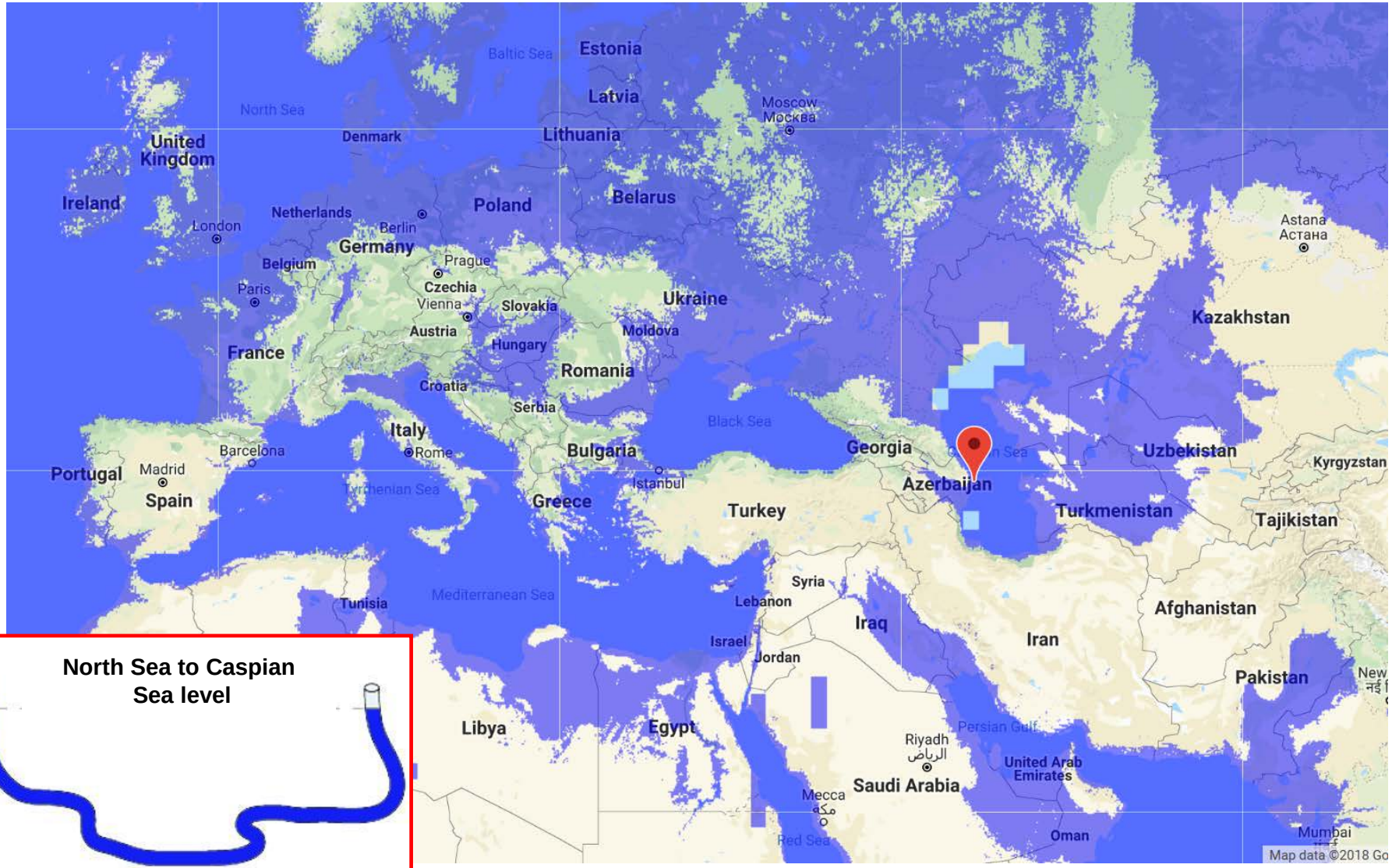
Marine Terrace near Gilazi (front edge around 100m asl)

How was it created? Tectonically or by a transgression

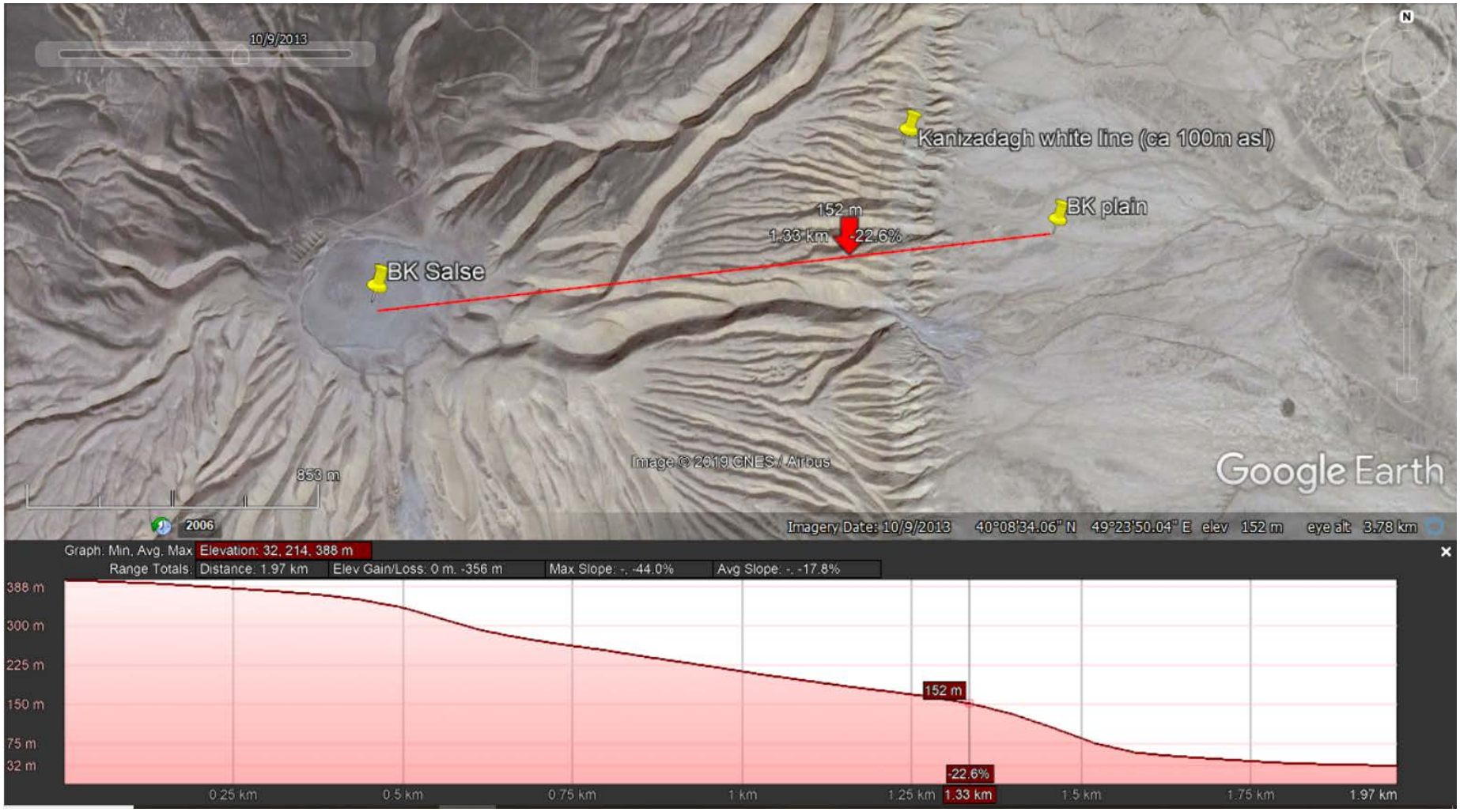
Terraces - Gilazi Valley entrance

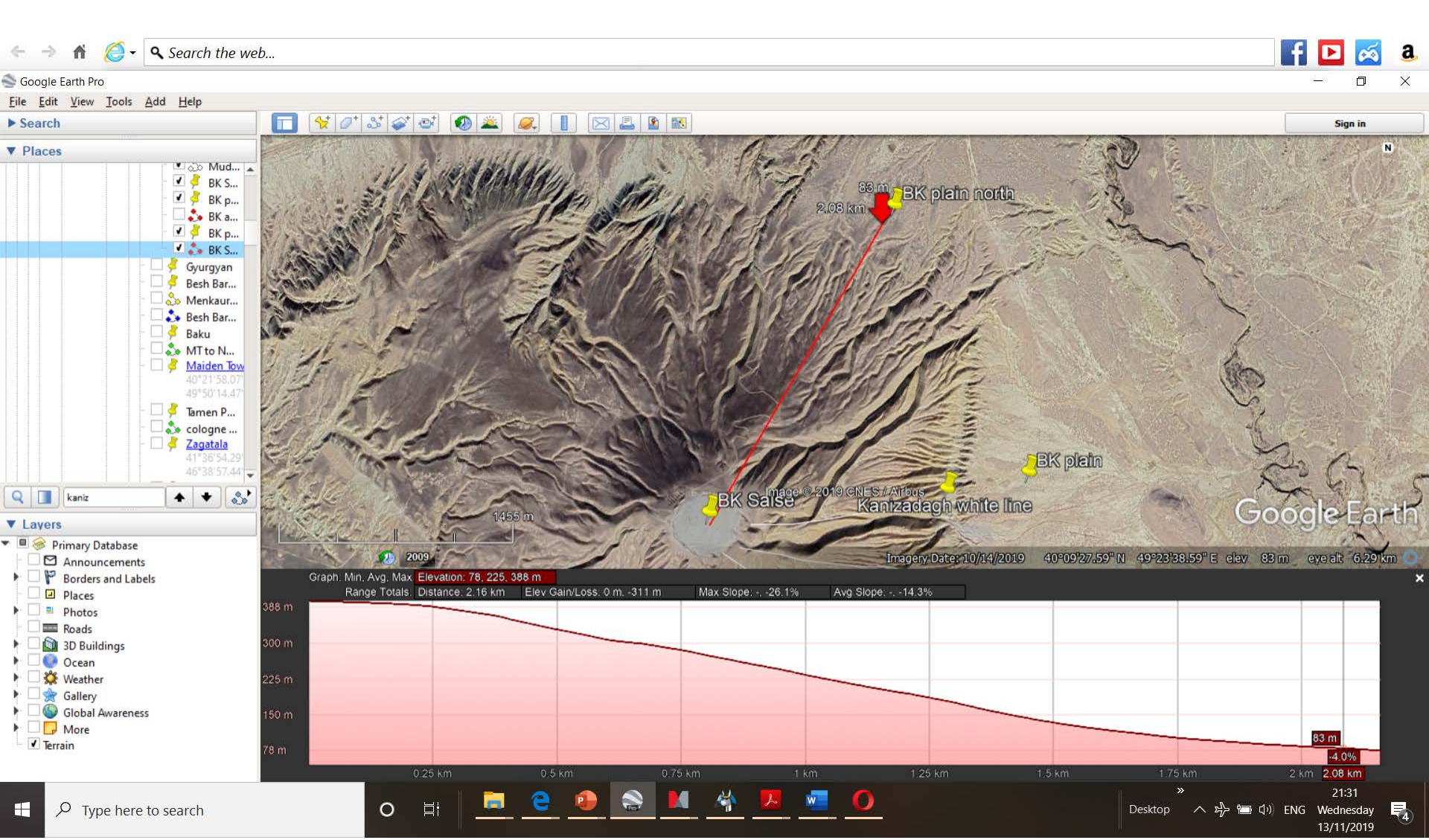
Flood Evidence on Mud Flow and Soft Sediments

What Eurasia looks like with a flood level of 222m amsl




File Edit View Add Tools Help
Aral sea
Flood Direction
20 Miles
© 2007 Europa
Image © 2007
Pointer 46°56'27.59" N 59°02'41.60" E elev 121 m
Image © 2007 TerraMetrics


10/9/2013
Kanizadagh white line (ca 100m asl)
BK plain
152 m
1.33 km -22.6%
BK Salse
Image © 2019 CNES / Airbus
Google Earth
853 m
2006
Imagery Date: 10/9/2013 40°08'34.06" N 49°23'50.04" E elev 152 m eye alt 3.78 km
Graph: Min, Avg, Max Elevation: 32, 214, 388 m
Range Totals: Distance: 1.97 km Elev Gain/Loss: 0 m, -356 m Max Slope: -, -44.0% Avg Slope: -, -17.8%
388 m
300 m
225 m
150 m
75 m
32 m
152 m
-22.6%
0.25 km
0.5 km
0.75 km
1 km
1.25 km
1.33 km
1.5 km
1.75 km
1.97 km


Search the web...
Google Earth Pro
File Edit View Tools Add Help
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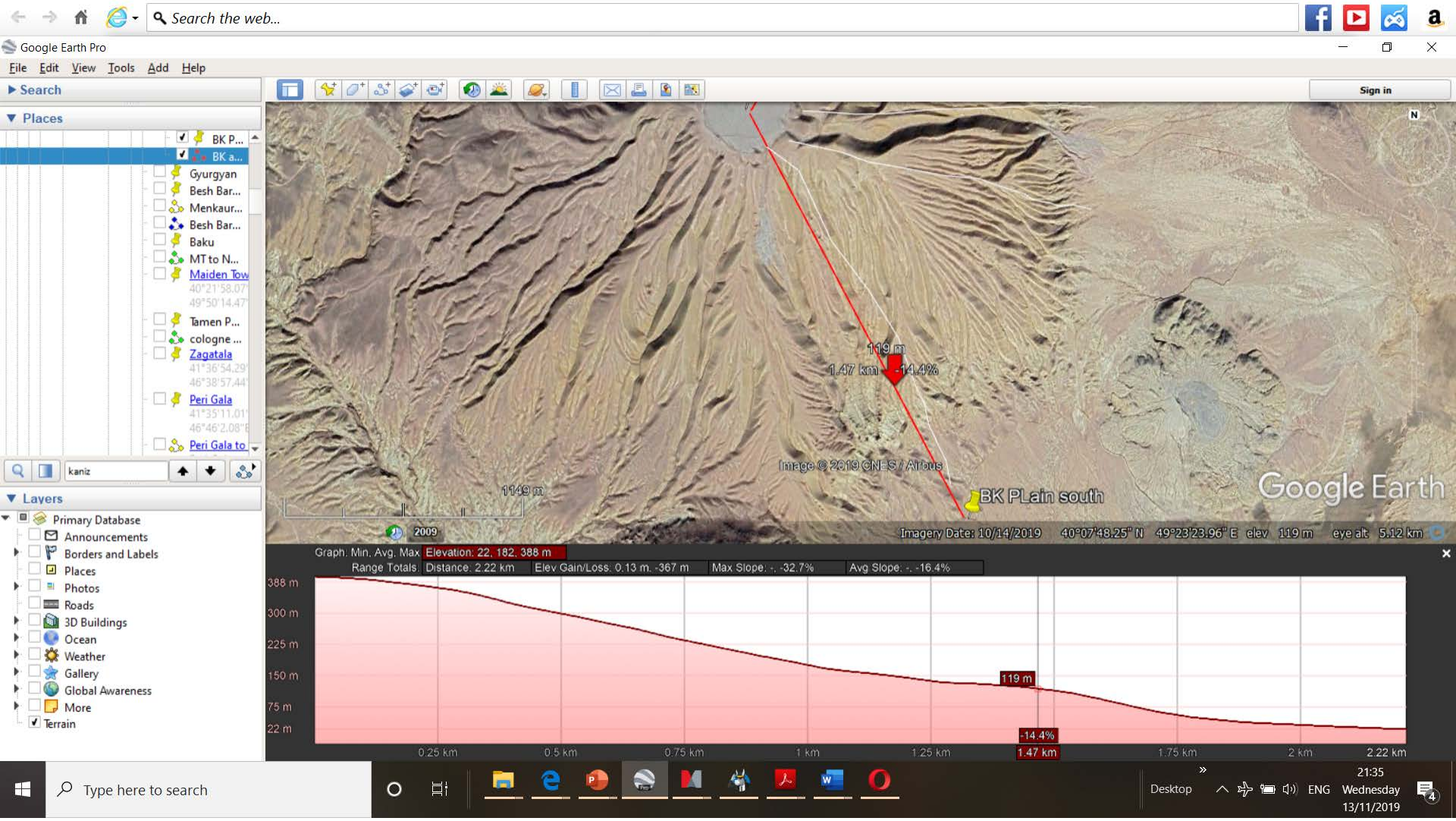
Primary Database
Announcements
Borders and Labels
Places
Photos
Roads
3D Buildings
Ocean
Weather
Gallery
Global Awareness
More
Terrain
Sign in
83 m
2.08 km
BK plain north
BK plain
BK Saise
Kanizadagh white line
Image © 2019 CNES / Airbus
Google Earth
1455 m
2009
Imagery Date: 10/14/2019 40°09'27.59" N 49°23'38.59" E elev 83 m eye alt 6.29 km
Graph. Min. Avg. Max Elevation: 78, 225, 388 m
Range Totals Distance: 2.16 km Elev Gain/Loss: 0 m, -311 m Max Slope: -, -26.1% Avg Slope: -, -14.3%
388 m
300 m
225 m
150 m
78 m
0.25 km
0.5 km
0.75 km
1 km
1.25 km
1.5 km
1.75 km
2 km
2.08 km
-4.0%
Type here to search
Desktop
ENG
21:31
Wednesday
13/11/2019


Search the web...
Google Earth Pro
File Edit View Tools Add Help
Search
Places
Sign in
BK P...
BK a...
Gyurgyan
Besh Bar...
Menkaur...
Besh Bar...
Baku
MT to N...
Maiden Tow
Tamen P...
cologne ...
Zagatala
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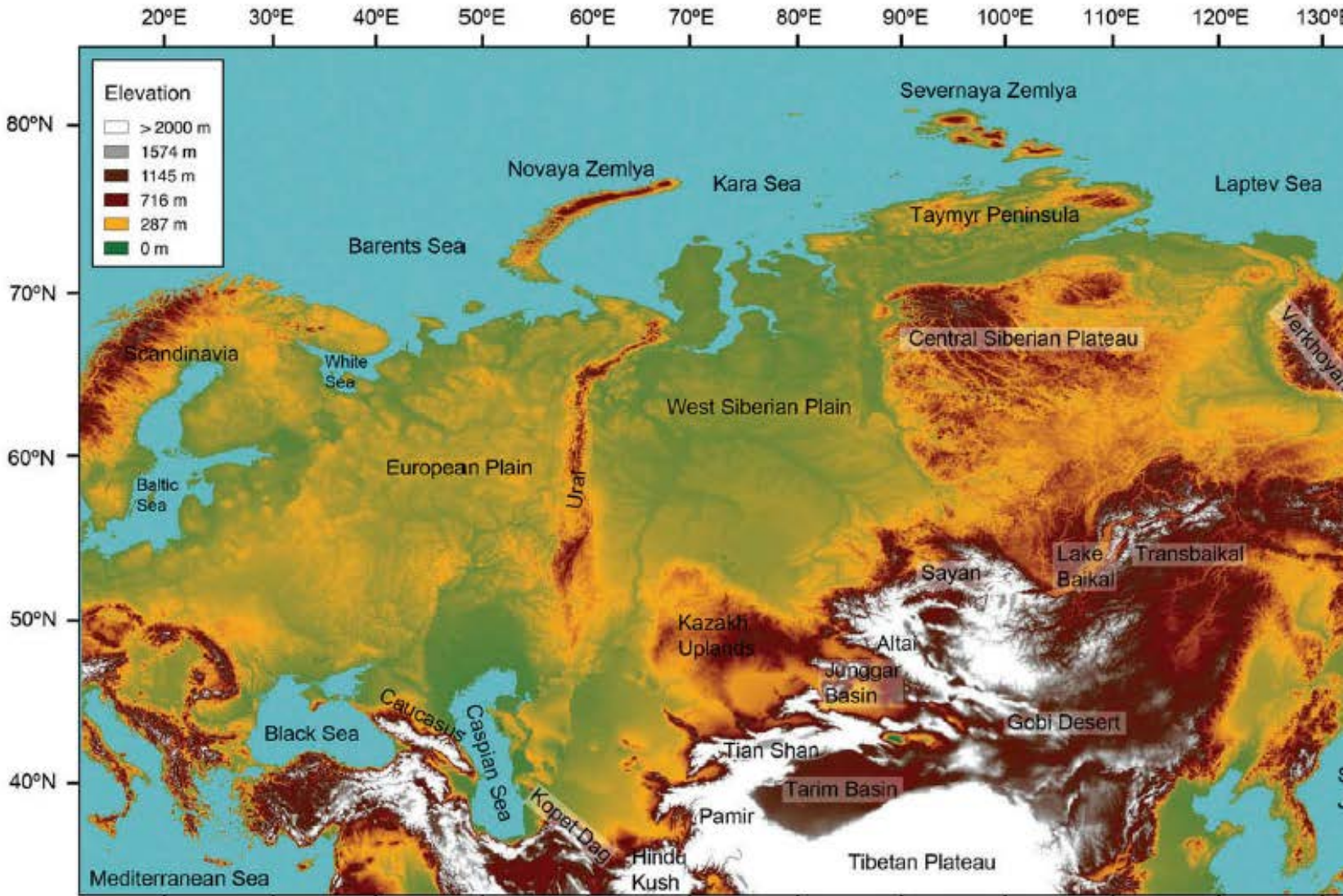
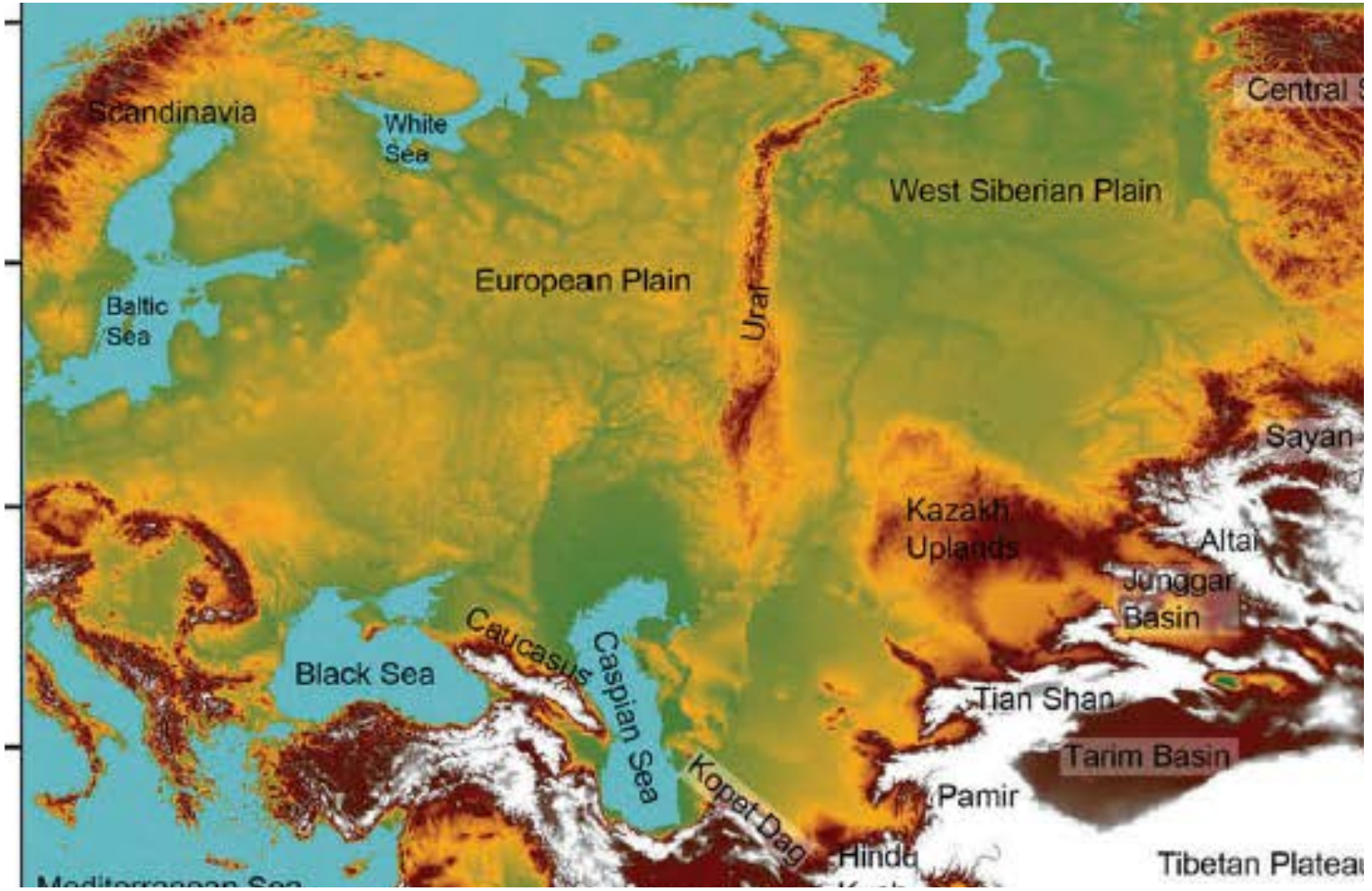
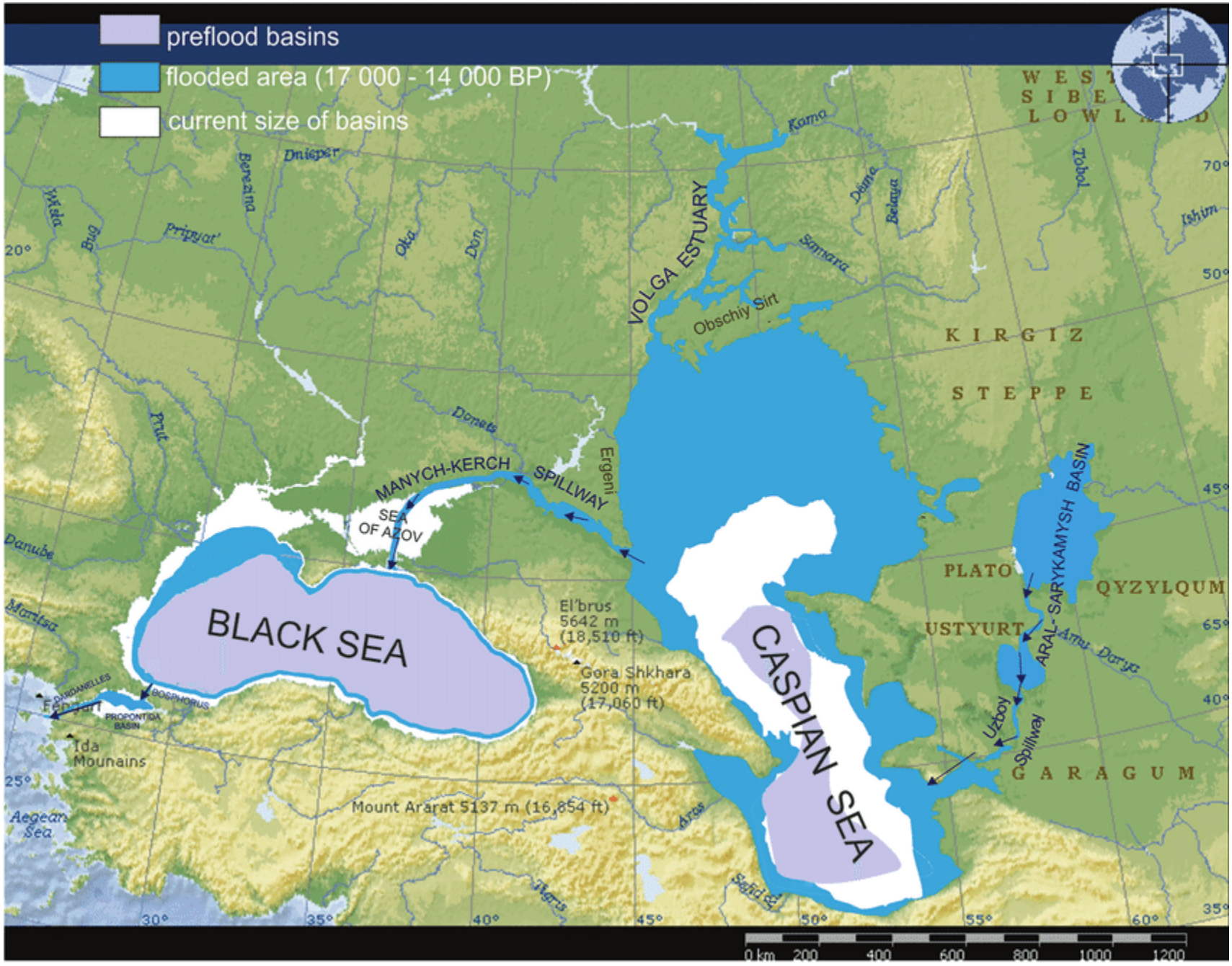
Announcements
Borders and Labels
Places
Photos
Roads
3D Buildings
Ocean
Weather
Gallery
Global Awareness
More
Terrain
119 m
1.47 km -14.4%
Image © 2019 CNES / Airbus
1149 m
BK PLain south
Google Earth
2009
Imagery Date: 10/14/2019 40°07'48.25" N 49°23'23.96" E elev 119 m eye alt 5.12 km
Graph: Min. Avg. Max Elevation: 22, 182, 388 m
Range Totals: Distance: 2.22 km Elev Gain/Loss: 0.13 m, -367 m Max Slope: -, -32.7% Avg Slope: -, -16.4%
388 m
300 m
225 m
150 m
75 m
22 m
119 m
-14.4%
0.25 km
0.5 km
0.75 km
1 km
1.25 km
1.47 km
1.75 km
2 km
2.22 km
Type here to search
Desktop
ENG
21:35
Wednesday
13/11/2019


20°E
30°E
40°E
50°E
60°E
70°E
80°E
90°E
100°E
110°E
120°E
130°E
80°N
70°N
60°N
50°N
40°N
Elevation
> 2000 m
1574 m
1145 m
716 m
287 m
0 m
Severnaya Zemlya
Novaya Zemlya
Kara Sea
Laptev Sea
Taymyr Peninsula
Barents Sea
Scandinavia
White Sea
Central Siberian Plateau
Verkhoyan
West Siberian Plain
European Plain
Ural
Baltic Sea
Lake Baikal
Transbaikal
Sayan
Kazakh Uplands
Altai
Junggar Basin
Gobi Desert
Caucasus
Caspian Sea
Black Sea
Tian Shan
Tarim Basin
Kopet Dag
Pamir
Hindu Kush
Tibetan Plateau
Mediterranean Sea


Scandinavia
White Sea
Central
West Siberian Plain
European Plain
Ural
Baltic Sea
Sayan
Kazakh Uplands
Altai
Junggar Basin
Caucasus
Caspian Sea
Black Sea
Tian Shan
Tarim Basin
Kopet Dag
Pamir
Hindu
Tibetan Plateau


preflood basins
flooded area (17 000 - 14 000 BP)
current size of basins
BLACK SEA
CASPIAN SEA
SEA OF AZOV
MANYCH-KERCH SPILLWAY
VOLGA ESTUARY
Obschiy Sirt
Ergeni
Donets
Dnieper
Berezina
Pripyat'
Bug
Wisła
Oka
Don
Kama
Samara
Belaya
Tobol
Ishim
Prut
Danube
Maritsa
Aegean Sea
Ida Mounains
DARDANELLES
BOSPHORUS
PROPONTIDA BASIN
El'brus 5642 m (18,510 ft)
Gora Shkhara 5200 m (17,060 ft)
Mount Ararat 5137 m (16,854 ft)
Argos
Tigris
Sefid Rud
KIRGIZ STEPPE
PLATO USTYURT
QYZYLQUM
ARAL-SARYKAMYSH BASIN
Amu Darya
Uzboy
Spillway
GARAGUM
WEST SIBERIAN LOWLAND
20°
25°
30°
35°
40°
45°
50°
55°
60°
65°
70°
0 km 200 400 600 800 1000 1200

Problematic Issues / Проблемные вопросы

Palaeolithic settlements elevated

Giant Flood scars

Chocolate Clays

Baer Knolls 9,600 +/-500 years BP

Sandwaves. Nikiforov / Putans

Alluvial Loess ?

Salt Lakes/regional

Giant Landslides Ustyurt Platea. Torysh spheres

Mytilus edulis/ galloprovincialis??

Ostracod increase with salinity 9720 yr BP

Cerastoderma glaucum 9,000–8,500 BP

C. glaucum 6000 BP

Bosporus opens 10000 yr BP

Diluvial Erratics ?

Water Chemistry, 9400 BP
- $^{87}Sr/^{86}Sr$ carbonate,
- brackish fauna shell hash
- peat deposits, 9500BP
- euryhaline (marine) fauna

Kyzylord antidunes Glacial dam collapse?

Rock Art
- Whales,
- Guillemot
- Stone Age Map
- Neolithic migration.

Low temperatures Sapropel Holocene outflow 10000 – 6500 y BP

Troy Bay Holocene sediments

Sapanca corridor

Iznik Beachrock

Raised terraces

Varves ?

Biodiversity
- Poor
- Little life below 100m

Strandlines BK Halocline

Other
- Egyptology/Culture
- Caucasian ancestry
- Flood legends

Mysis Shrimp evolved during ice ages. Arctic sp.

Marine Flood explanation

Ice Age Flood explanation

English Channel Canyon?

Mammoth fractures / flood trauma?

Caspian and Baikal Seals TBD.

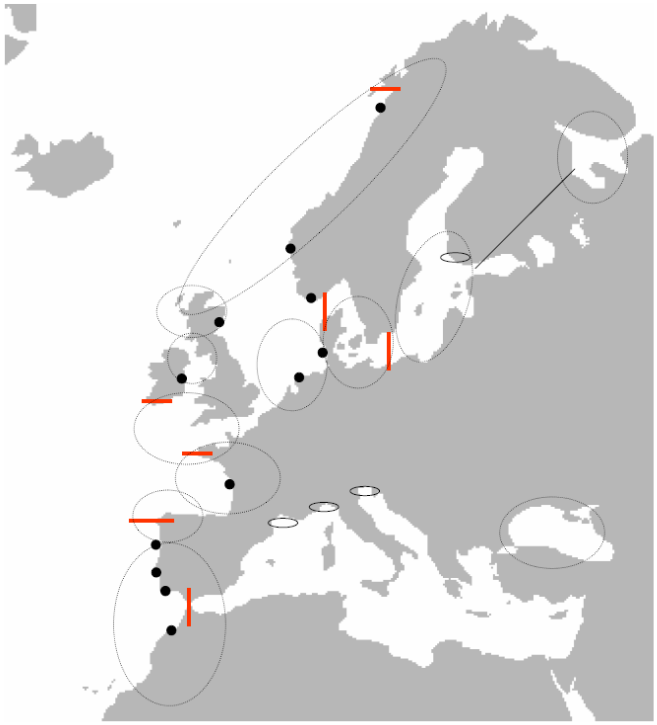
Novosibirsk whale bones. TBD

Figure 1. Laminated sediment layers at the entrance to the Qobu Valley, elevation 0 m agsl

Table 1. Radiocarbon dating results of bulk mollusk samples from the Caspian and Black seas.

COUNTRY	General Location (GPS coordinates available)	Elevation above global sea level (m)	Measured Age	$^{13}C/^{12}C$	Conventional Age
AZERBAIJAN	Gobustan at 8 m	8	26110 +/- 180 BP	+2.5 ‰	26560 +/- 190 BP
	Gobustan at 18 to 30 m	18-30	28520 +/- 210 BP	+1.1 ‰	28950 +/- 220 BP
	Gobustan at 80 to 85 m	80-85	14310 +/- 70 BP	+1.6 ‰	14750 +/- 80 BP
	Terrace top near Gobustan	100	32460 +/- 480 BP	+2 ‰	32910 +/- 510 BP
	Gobustan 125 m	125	16770 +/- 100 BP	+1.6 ‰	17210 +/- 100 BP
	Qobu terrace near rock shelter	140	40730 +/- 530 BP	+1.1 ‰	41160 +/- 530 BP
BULGARIA	Thracian Cliffs	126	29010 +/- 170 BP	+2.8 ‰	29470 +/- 170 BP
	Thracian Cliffs	77	39200 +/- 490 BP	+2.7 ‰	39650 +/- 490 BP

Source: BetaLab. Note that most dates are within the C^{14} half-life limitation.



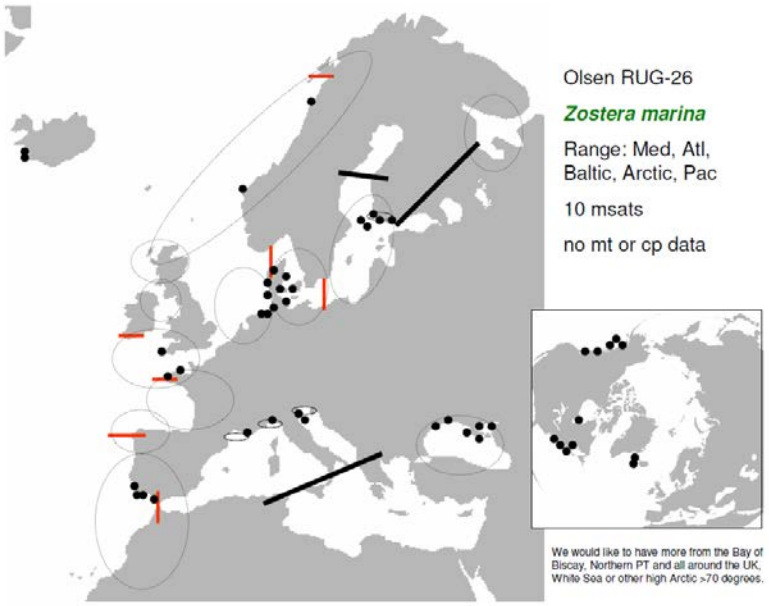
Krakau AWI-14

Cerastoderma edule

Range: Atl, entrance of Baltic until Danish strait, Barent Sea

COI

(AFLP soon)



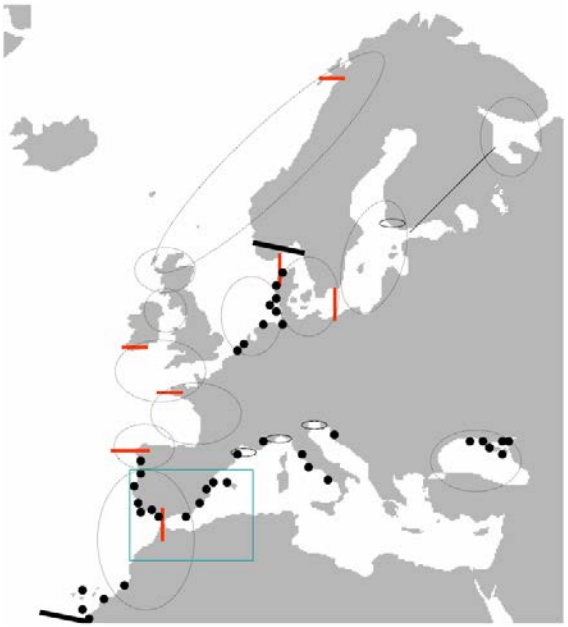
Olsen RUG-26

Zostera marina

Range: Med, Atl, Baltic, Arctic, Pac

10 msats

no mt or cp data



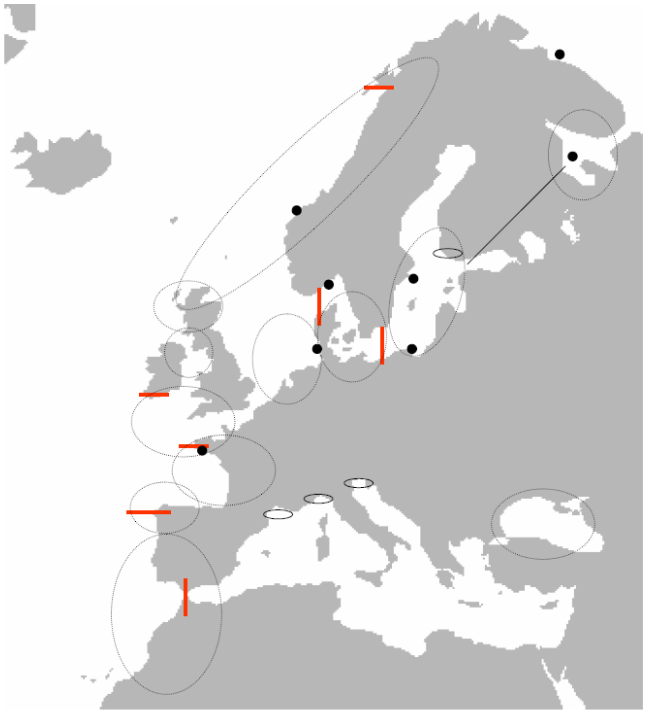
Olsen RUG-26

Zostera noltii

Range: Med, Atl to Mauritania

9 msats

no mt or cp data



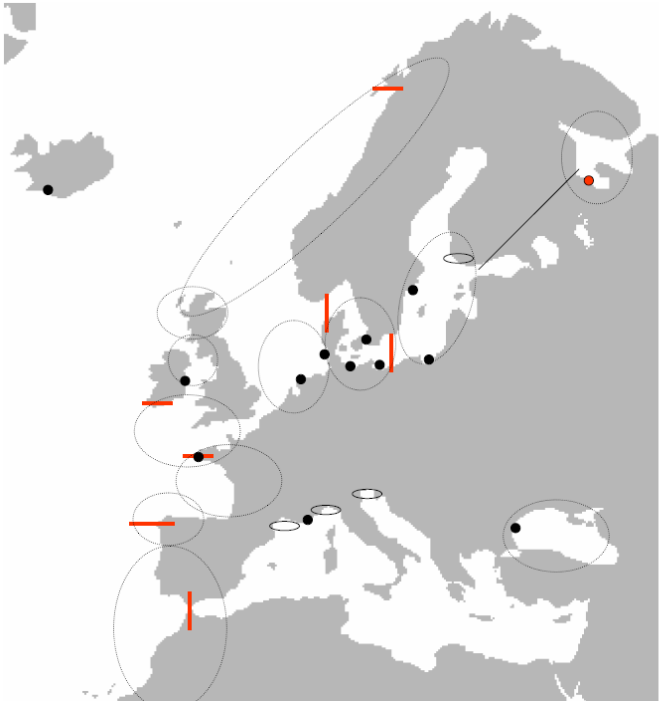
Jacobsen AWI-14

[would like to combine with Wolowicz data]

Mya arenaria

Range: holarctic incl. Baltic and Black Sea, a few reported from the Med

ITS 1+2 and Cyt b sequences



Wolowicz IO UG-39

Mya arenaria

[would like to combine with Jacobsen samples]

Range: Atlantic, North Sea, Baltic, Mediterranean Sea, Black Sea

allozymes

COI

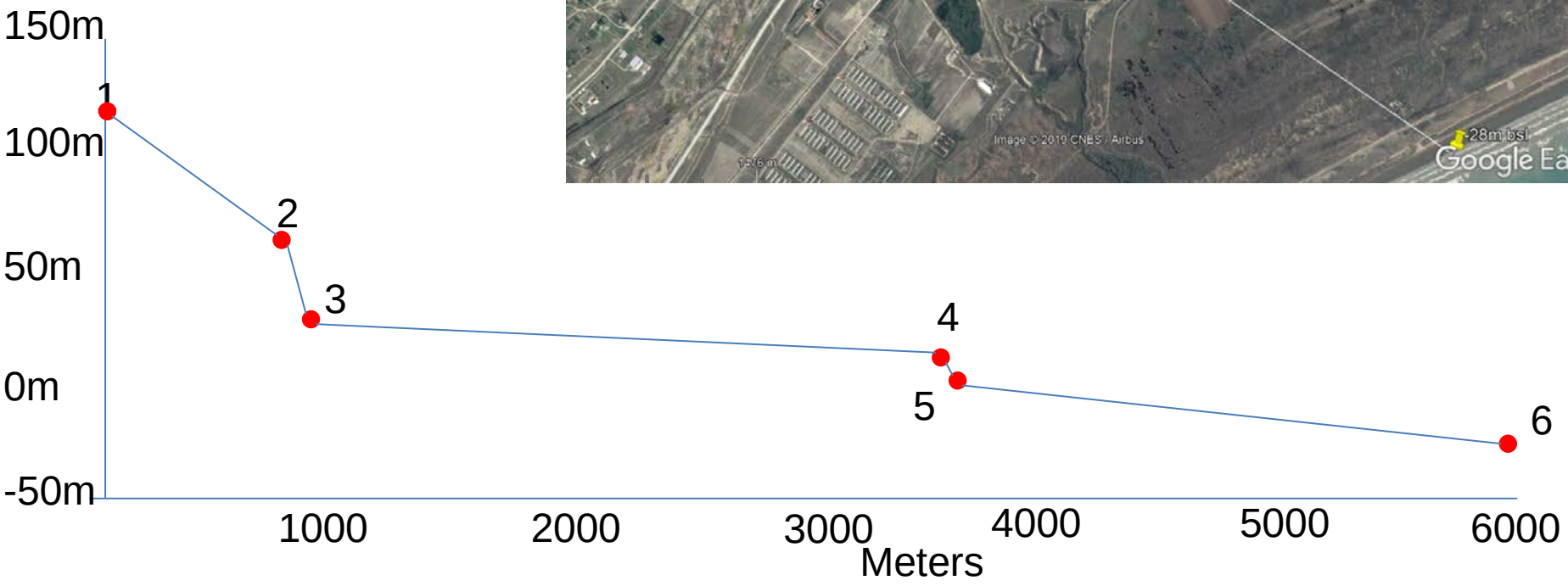
(microsat soon)

- coming soon

Siyazan Terrace Transect to Caspian Sea – Step changes – Why?

Сиязан Терраса Трансект в Каспийское море - Шаг изменения - Почему?

	Site	Height (m)	Distance from upper terrace top	Total distance (m)
1	Upper terrace top	113	0	
2	terrace edge	60	762	762
3	Lower terrace top	26	212	974
4	Lower terrace top 2	11	2622	3596
5	Zero level strandline	0	54	3650
6	Caspian Sea	-28	2318	5968



Besh Barmak strandlines on sheltered side of mountain

Sea horizon

+ 150 m

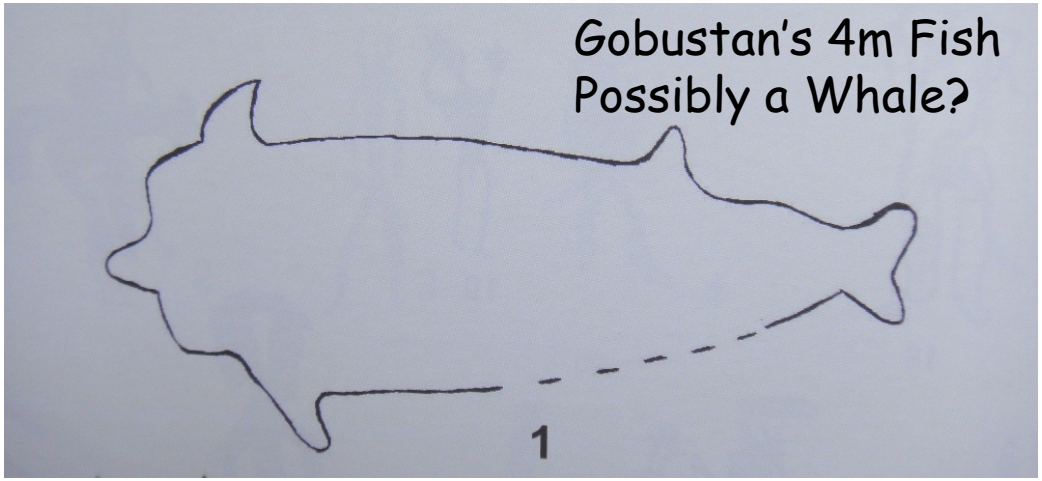
Tectonic uplift or sinking coastline? **Not significant in short term**

Likely Consequences of Marine Flooding-1

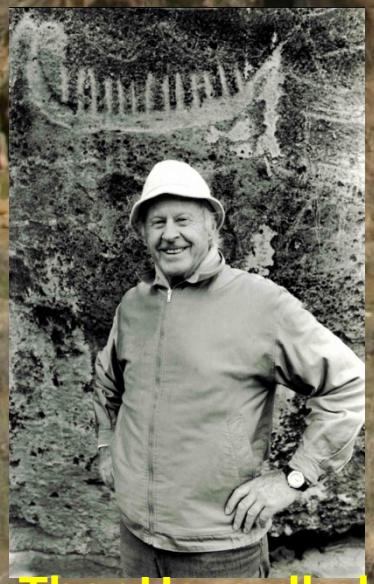
- Creates paradoxes and puzzles across the Ponto Caspian, which based on eustatic seal level rise are difficult to resolve.
- Human and animal mortalities across low lying areas.
- Soil erosion
- Salination of soil
- Contaminated water supplies
- **Caspian, Black and Aral lakes become salty/brackish.**
- Creation of salt lakes around 100m asl.
- Sapropel formation and deoxygenation
- Erosion / opening of Bosporus and Dardanelles spillways.
- Flood debris and erratics away from glaciers.
- Tsunamis, high energy beaches.
- Causes a megaflood in the English Channel.
- **Creation of the Baer Knolls**

Likely Consequences of Marine Flooding -2

- Species introduction into Caspian, Black and Aral Seas. Note whales and arctic birds introduced to the Caspian as seen in Rock Art.
- Caspian and Baikal Seals moved inland with previous marine flood events.
- Extinction of fresh water aquatic species.
- Step changes in palynology, foraminifera microfossil evidence.
- Earthquakes.
- Climate change
- Disruption of early civilizations, archaeological gaps.
- Myths and Legends generated. E.g. Biblical account of Noah and other flood stories.
- Fear of low-lying countries.
- Human migration inland to higher areas and new lands.
- Other ?……



Bangudae Petroglyphs: Whales



Thor Heyerdhal

Gobustan Boats with multiple carvings / lines nearby

Similarities to Gobustan

Cross Poles: Purpose?
To dry Meat ?

Cross Poles:

Twin plume Whale spouting?

Fish Tail?

Gobustan Boats

Whaling Boats?

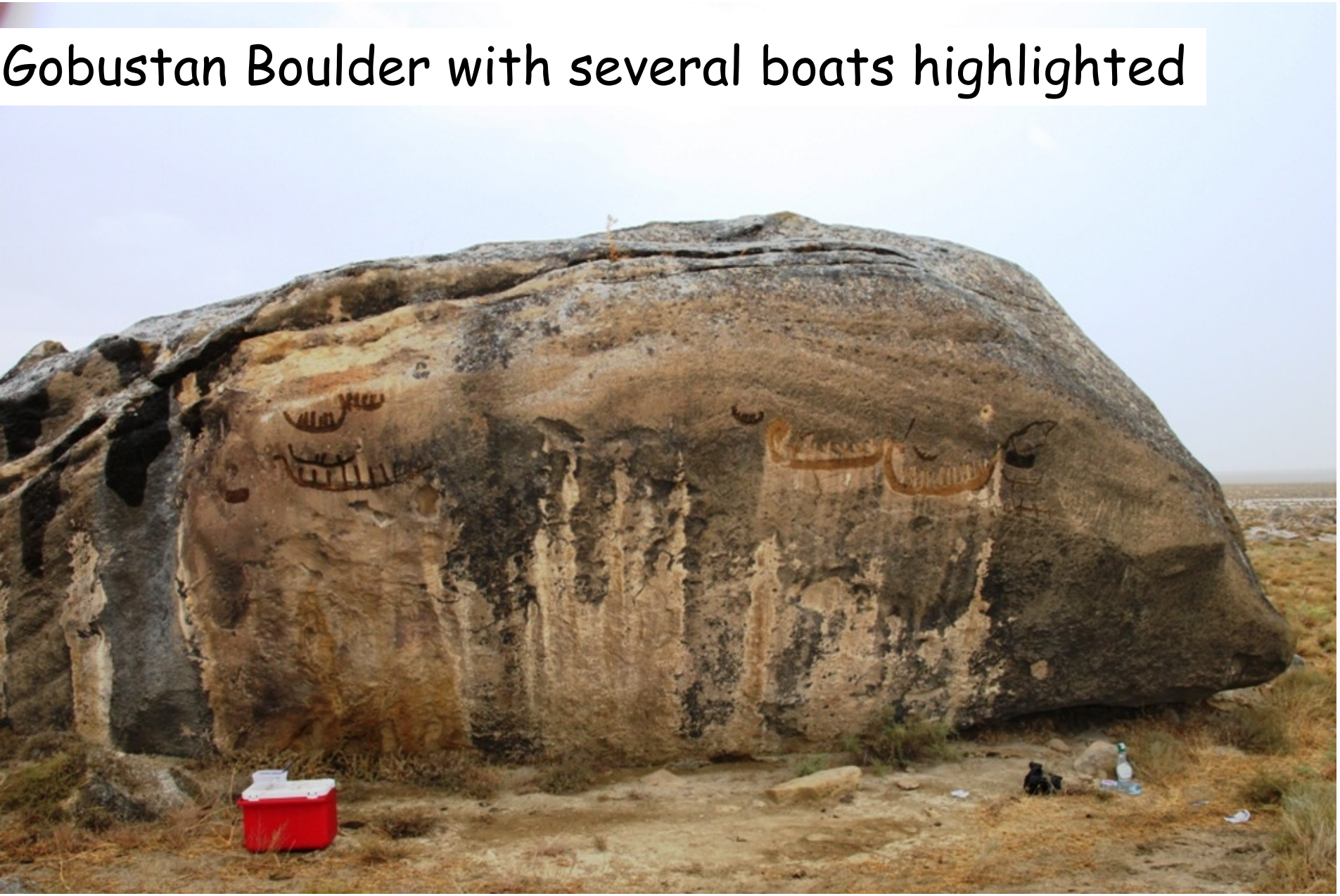
Two Different Boats at Gobustan

1. Sun/Cockerel symbol and cross sticks

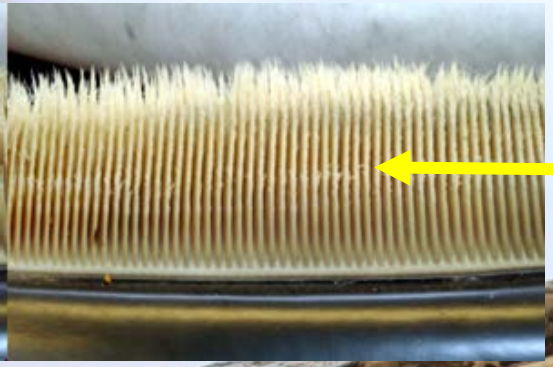
2. 14 oars and twin plume at bow.

Could these be involved in WHALING?
One to catch, one to process?

Gobustan Boulder with several boats highlighted



Gobustan Boulder with odd boats ??

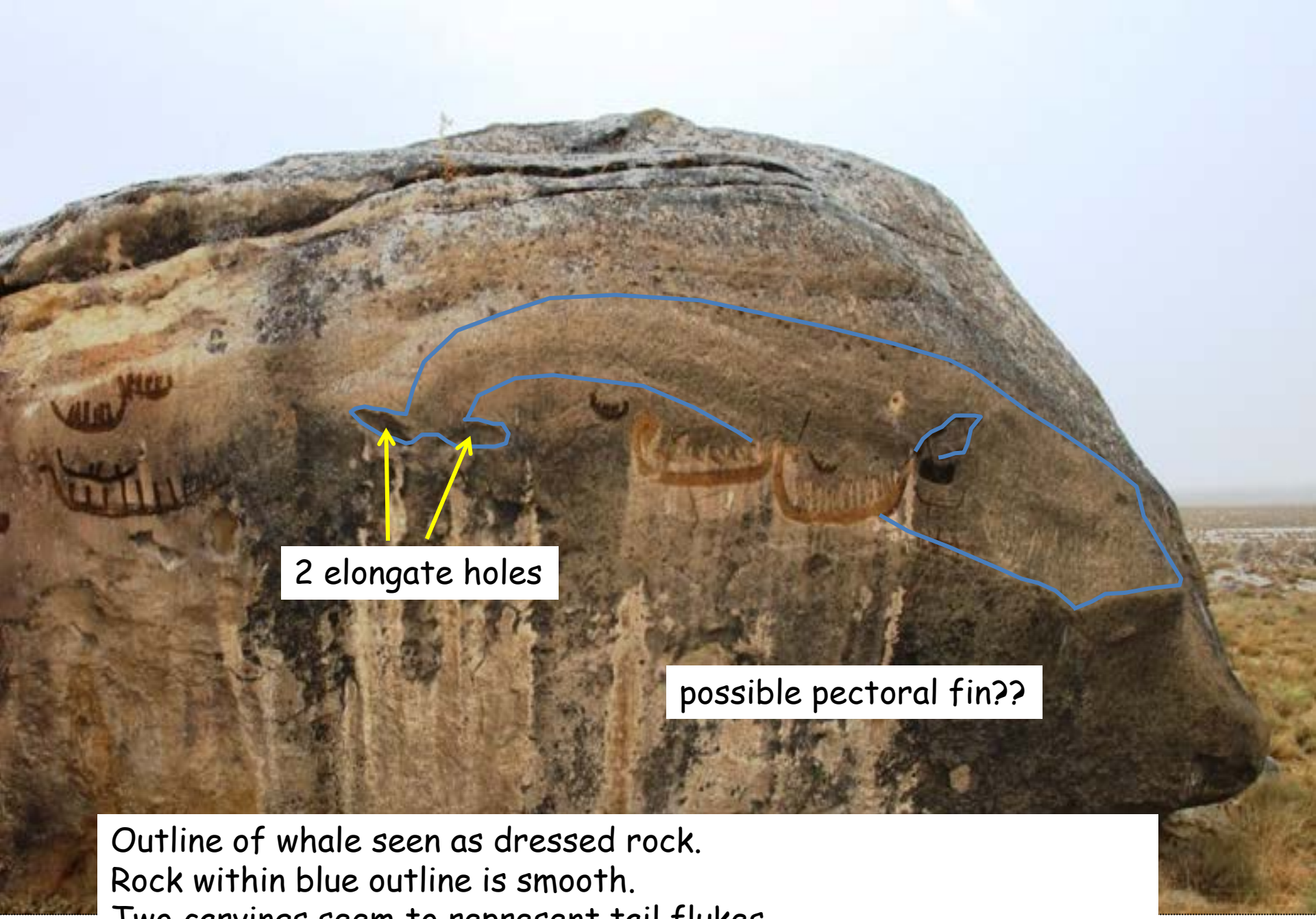


Possibly
Baleen e.g.

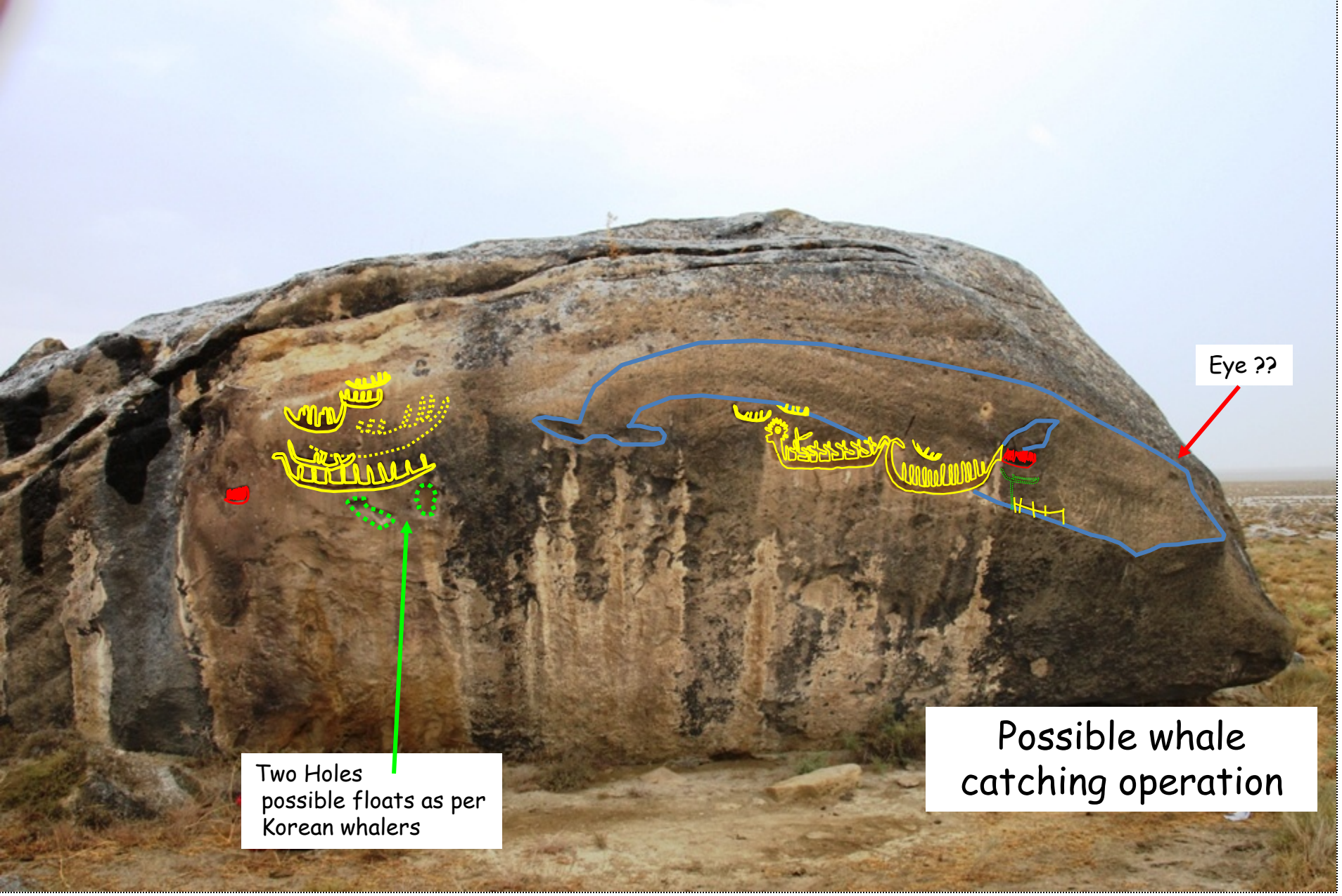
Fence like carving

Not unlike Bangudae

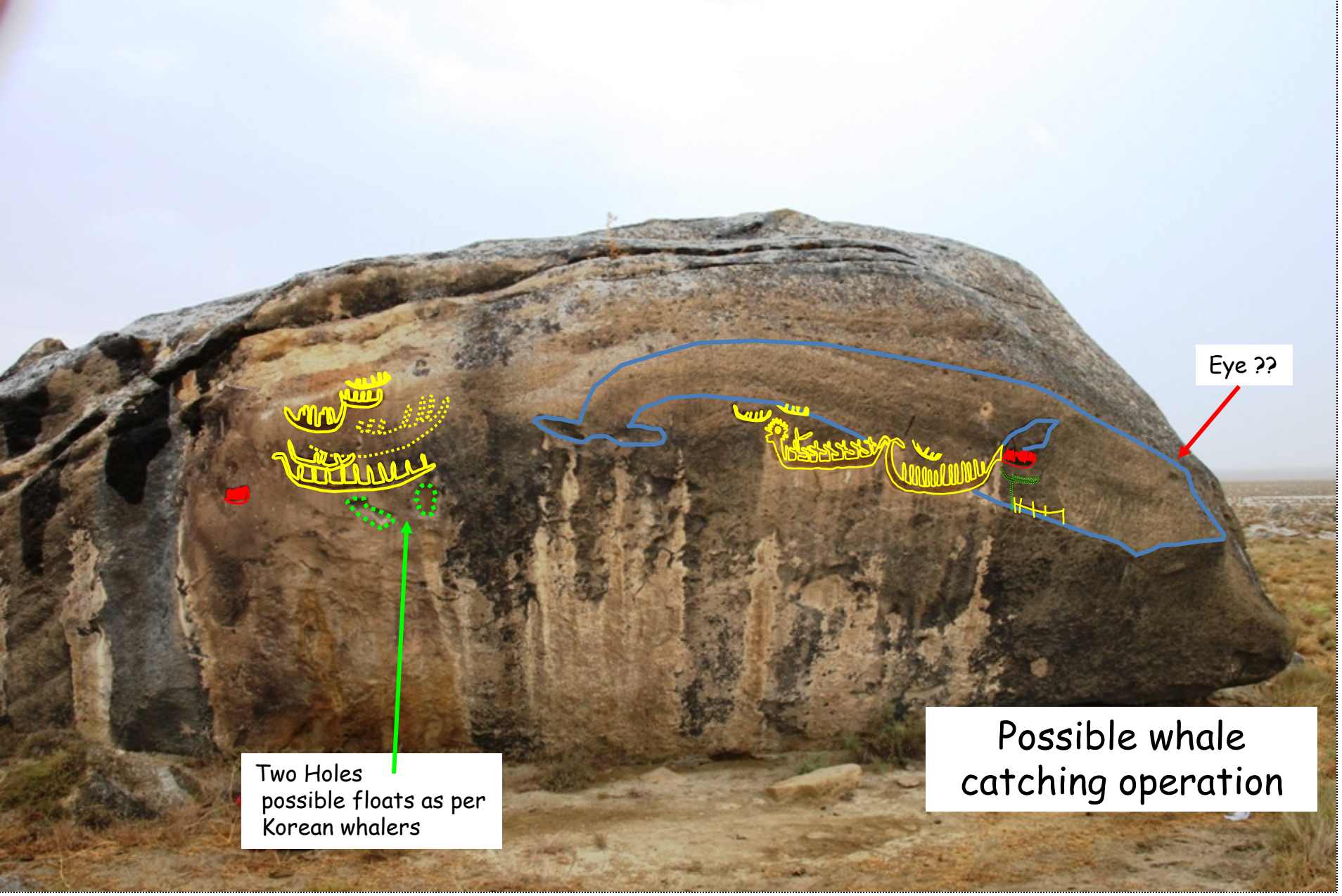

Odd Shape



Outline of whale seen as dressed rock.
Rock within blue outline is smooth.
Two carvings seem to represent tail flukes
Other boats around whale suggests a whale catching operation



Need to prove rock panel has been smoothed.
If so such a large whale indicates significant Arctic connection.



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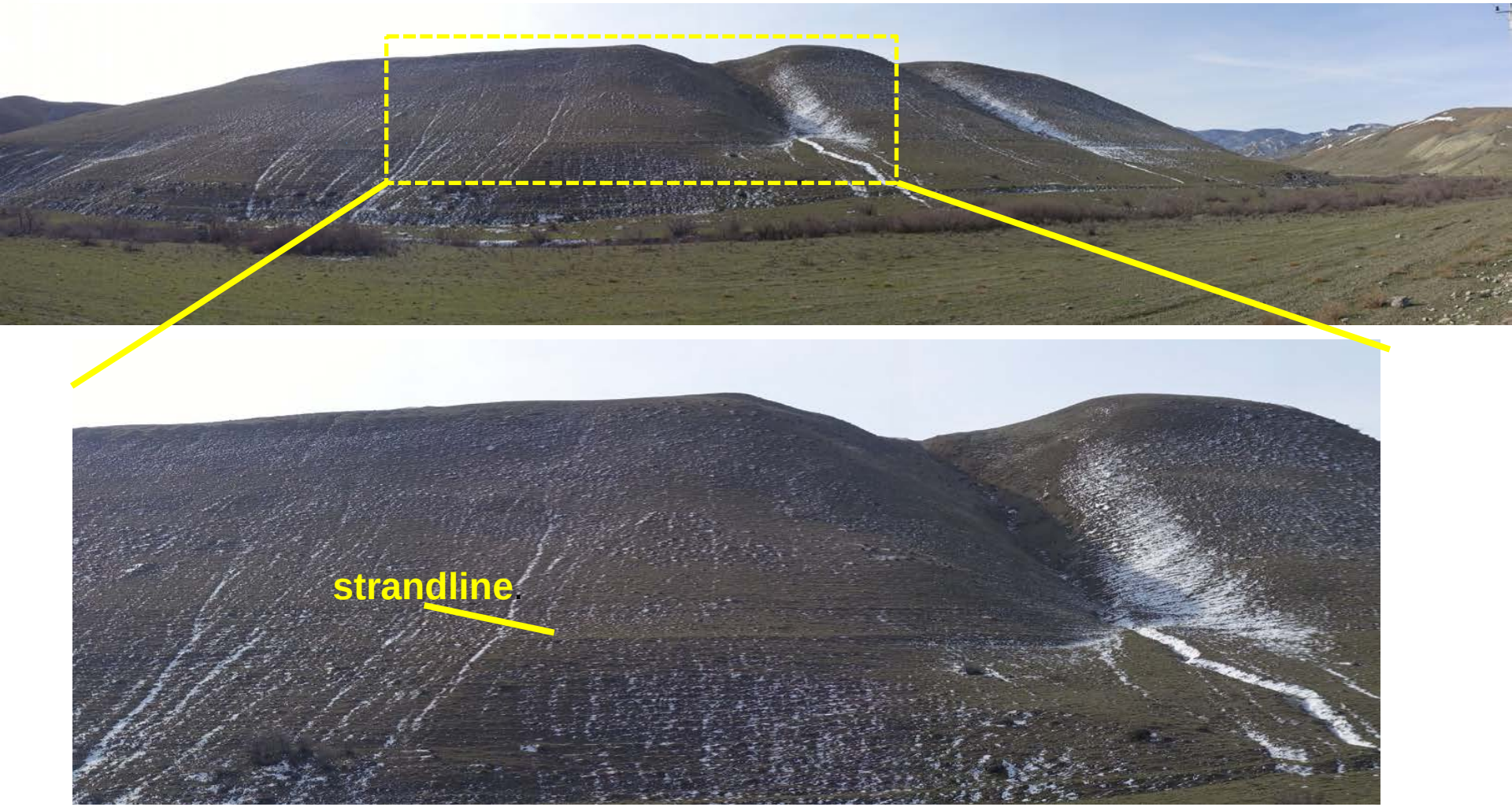
Gilazi Valley Upper Strandlines
Долина Гилази Верхние Стрэндлайны



Slide 12. Rising strandline as viewed from Gilazi Valley road.
Elevation approx. 339 m agsl. Location - 40°54'2.55"N 49° 8'23.09"E.